Railway Age

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Locating Executive Ability

DURING recent years there has been a steadily growing recognition on the part of railway officers of the necessity of raising the standards of supervision. The most striking evidence of this is to be found in the rapid increase within the past year of supervisors' clubs and training classes. Present indications are that this development will be speeded up at an even greater rate this fall and winter. It is, therefore, not surprising that more and more attention has been focused upon the problem of selecting men for promotion. The great difficulty is that the men in the ranks ordinarily have little opportunity of demonstrating whether they have sufficient executive ability to warrant being promoted to supervisory positions. One of the advantages of employee representation, which was brought out at the Silver Bay Conference on Human Relations in Industry last week, was that it tended to locate and develop employees with natural leadership ability. This was given as the experience of one large company which had used employee representation for several years, and an informal check-up among a number of delegates to the conference, including railway representatives, as well as those from other branches of industry, disclosed the fact that much executive talent was being uncovered and developed in connection with those organizations which have used employee representation of the association type for any length of time. This advantage should not be overlooked in studying the two articles on employee representation, the second of which will be found elsewhere in this number.

Revenue Lost When Refrigerator Cars Are Held

REPORTS made by the Class 1 carriers of the United States to the Car Service division of the American Railway Association, for the period from July 9 to August 20, show that insufficient effort is being made to release refrigerator cars within the 48-hour free-time limit. During this period of six weeks an average of only 70 per cent of the refrigerator cars handling fresh fruits and vegetables were released within 48 hours. This percentage falls far short of the 85 per cent estimated in the *Railway Age* of July 31 as necessary in order to handle this year's movement of fresh fruits and vegetables without a refrigerator car shortage. Unless greater effort is made to release refrigerator cars promptly shippers will experience difficulty in procuring cars during the peak of the shipments that will be ready for movement during the next few months. The condition that prevailed during the period referred to supports this statement, since during this time no unusual shipments moved with the exception of peaches, which were only five per cent heavier than last year. With a surplus of peaches on the market many refrigerator cars were held at destination and used for storage by firms who had no storage facilities, while many others were held awaiting a rise in the peach market; still others were not released because of reconsignment from destination. This failure to release cars promptly imposes upon the carriers a loss which far exceeds the $1 per day demurrage paid by the shipper, for this loss includes the revenue a car could earn if it were in service and the cost of owning a car. The former cannot be definitely determined, but a study made by the Chicago, Rock Island & Pacific as to the cost of merely owning a refrigerator car shows the latter to be $1.45 per day. This is based on the cost of a modern refrigerator car, which is between $3,200 and $3,400, while its average life is 21 years, with two general overhaulings, which makes the depreciation $150 a year or 41 cents per day, allowing a salvage value of $250 at the end of the 21 years. Running repairs average $175 a year or 48 cents a day and the interest on the original investment amounts to $204 a year, or 56 cents a day, making a total of $1.45 a day without regard to the earning value of the car during the period of maximum demand.

Why Not Attend the Steel Treaters' Convention?

RAILROADS use about one-third of the total tonnage of finished steel produced by mills in the United States. Are the railroad methods of specifying, treating and using this immense quantity of steel all that can be desired? Is carbon steel, whether used in tools or in equipment parts, receiving the treatment designed to make it give the most effective service? Can the railroads save money by the more extensive use of alloy steels? These are highly pertinent questions on which railroad men can get much light by attending the annual convention of the American Society for Steel Treating, to be held at Chicago, the week of September 20, in connection with the National Steel and Machine Tool Exposition. The leading minds in the steel and associated industries will be present at this convention—experts in steel making, treating and using, and the utmost advantage should be taken of their knowledge and experience. In all, 36 technical papers will be presented during the five days of the convention at the Drake Hotel, many of which have been prepared by well-known scientists and special investigators in this country and abroad. An extensive demonstration of manufacturing and equipment processes of the steel industry will be shown in the exposition, which will occupy a total floor area of 80,000 sq. ft., or the entire capacity of the Municipal Pier. The machine tool section, requiring 5,000 hp. to operate, will show in a striking way the best modern methods of machining metals. The best methods of heat-treating equipment, using all types of fuel, will

be shown. Numerous exhibits of inspection equipment will indicate the types best adapted to specific test purposes. It must be admitted that railroad practice in the handling of steel is in many respects unsatisfactory. Annealing and heat-treating furnaces, for example, are often found with no baffles to keep the flames from playing directly on the work, or without proper regulation of temperature and furnace atmospheric conditions. In some cases railroads are using iron or mild steel in places where the proper kind of alloy steel might reduce wear or prevent failure. In other cases steels are being used which, because of improper specification or subsequent heat treatment, are not producing the results desired. The railroads cannot afford to overlook the opportunity that a good representation at the Steel Treaters' convention will afford to secure accurate and up-to-date information regarding steel and modern steel-handling practices.

Why Aren't They All Scientific?

"YES, the 'Y. & Y.' is now a scientifically maintained road," was the comment of a railway officer in discussing the policies of a particular railroad which has made marked improvements in the manner of handling its maintenance of way operations. This remark obviously carried with it the implication that only certain railroads are "scientific," and it must be conceded that there is a wide variation in the extent to which the principles of scientific management and engineering knowledge are applied in the handling of maintenance-of-way work.

As a matter of fact, there is an unfortunate lack of balance in practices on various railroads. A few roads enjoy reputations for a high degree of excellence in all operations, while some give evidence of "arrested development." Most of them, however, are leaders in one or more phases of work. One exercises extreme care in the purchase, treatment and allotment of ties. Another leads in the elimination of rails from heats showing transverse fissures. Still another is enjoying the benefits of studies of labor costs, and another is making marked progress in the training of its men. But most roads achieve distinction only in doing certain parts of maintenance work, their practices in other respects being mediocre as compared with what other roads are doing.

Marked excellence in some one phase of the work of a department can usually be ascribed to the interest, perseverance and energy of some one man who has virtually made a hobby of it and has convinced the management that his ideas are worthy of application. Outstanding efficiency as regards the work of the entire department must also be ascribed in some measure to the officer in general charge, but depends in much larger measure on the policy of the management with respect to the authorizing of expenditures that do not promise an immediate return. The management must be willing to buy something other than the cheapest in first cost. Labor-saving equipment reduces the payroll but it costs money. Good ties will last longer than poor ones, but poor ones can probably be bought for less.

However, the primary requisite for the attainment of excellence in the conduct of maintenance-of-way operations is adequate supervision from the top of the organization to the bottom. To improve practices it is necessary to study the requirements closely and then see that adopted rules are rigidly applied. This calls for an effective system staff and a sufficient number of supervisory officers to insure that territories will be small enough to permit effective training and supervision of the foreman.

Because of the increased outlay which these measures entail, the benefits to be derived are unattainable by certain roads, because, as has often been said, some roads are too poor to practice economy. With others, as stated above, the problem is simply that of hazarding an investment promising "deferred dividends," but the soundness of which has been thoroughly demonstrated by the results obtained on certain other roads. Surely, there is opportunity for more railroads to reap the benefits which come from improved practices in the diversified field of maintenance-of-way.

Living Costs, and Railway Wages, Rates and "Profits"

WHEN the eastern lines and the conductors' and trainmen's brotherhoods made an agreement last week to arbitrate the question of an advance in wages there may have begun a new period in the history of American railways. The railways and the brotherhoods deserve public commendation for having decided to settle their differences in this way. Directly, the controversy affects only the eastern railways and their conductors and trainmen, but indirectly it involves the question of whether, under existing conditions, there should be made a general advance in the wages of all the employees of these railways, and even of the employees of all the railways of the country.

This is a matter which concerns railway employees, investors in railway securities and the general public, because it is impossible to change wages without affecting either the net returns earned by the railways, or the rates that are or would be charged by them, or the service rendered, or even all of these. The efficiency of railway operation may be, and actually has been, so increased as to make practicable simultaneously advances in wages, increases in net returns, reductions of rates and improvements of service, but nevertheless any change that is made in one of these factors will necessarily make one or more of the others different from what they otherwise would be. Therefore, while relatively small readjustments of wages should be effected by direct negotiations between railway managements and employees, the more important changes in them, like those in rates, should be determined through public hearings in which economic conditions and principles are somewhat fully considered and discussed.

The Transportation Act set forth certain "relevant circumstances," such as the wages paid for similar work in other industries and the cost of living, which the Railroad Labor Board should consider in making wage awards. The labor provisions have been repealed, but this has not altered the economic factors that should be considered by an arbitration board. One circumstance which the Transportation Act did not definitely mention, but which the carriers urged it to consider in the wage controversies in 1921 and 1922, is the degree of prosperity of the carriers. The carriers were suffering greatly from adversity at that time, but the labor union leaders opposed this being given weight. It seems probable that in the approaching arbitration they will urge that it be given weight, although they may be somewhat guarded in what they say concerning this point because any argument they might base upon the comparative prosperity of the eastern lines would subsequently be used against

them in any arbitration proceeding involving wages on the western lines.

Having in mind the fact that in every controversy over either railway wages or railway rates there are necessarily involved the economic needs and rights of the employee, the investor and the public, and that we undoubtedly are at the beginning of a movement for advances in wages of all railway employees, it is interesting to review developments in the railway field and the situation that now exists as a result of them. The best year with which to start such a review is 1914, when the war in Europe began. In 1916 and 1917, although they were increased, the average wages of railway employees lagged behind the cost of living, and in 1919, because their hours of work were reduced, their average annual wage again briefly lagged behind it, although their average hourly wage kept ahead of it. In 1920, however, both their average annual and their average hourly compensation had increased relatively much more than the cost of living, and their wages, as compared with those of 1914, have been relatively much higher than the cost of living ever since. At the end of 1920 the cost of living was 95 per cent higher than in 1914, while the average annual wage of railway employees showed an increase of 131 per cent and their average hourly wage an increase of 172 per cent. At the end of 1923, after the business depression and when the effects of the shop strike had been largely overcome, the cost of living still showed an increase over 1914 of 68 per cent, the average annual wage of railway employees an increase of 93 per cent and their average hourly wage an increase of 134 per cent. Since then the cost of living has been almost stationary, while the trend of railway wages has been upward. In the first quarter of 1926, the average annual wage showed an increase of 102 per cent since 1914 and the average hourly wage an increase of 144 per cent, while the cost of living showed an increase of 66 per cent. Obviously, no case for an advance in wages can now be made upon the basis of comparisons between wages and the cost of living.

While average annual and hourly wages have been slowly increasing and are now the highest since 1921, railway rates have been declining. The changes in freight rates may fairly be compared with those in the wholesale prices of commodities. Between 1914 and September, 1920, the average advance in the wholesale prices of commodities was 137 per cent. The advance in freight rates which went into effect late in August, 1920, made them average about 72 per cent higher than in 1914. Since the advance of commodity prices was so much greater than that of freight rates, the subsequent decline of commodity prices also naturally was much greater. Comparing with 1914, commodity prices in 1923 showed an average increase of 57 per cent and freight rates in the country as a whole an average increase of 51 per cent. Since then commodity prices and freight rates have declined together, the increase over 1914 shown for the former in May being 54.6 per cent and for freight rates only 46 per cent. The advance in rates in the west has been much less than this average. These figures show that in the country as a whole comparative commodity prices and freight rates do not afford any basis for an argument for reductions of rates. If there should be an advance in rates sufficient to enable the western lines to earn a so-called "fair return," the general level of freight rates in the country would still be lower than the general level of commodity prices.

The foregoing facts show that the existing relationship of railway wages to the cost of living does not constitute an argument for a general advance in wages; that, since railway wages have increased much more than commodity prices, there would be no warrant for advancing rates on commodities in order to enable the railways to pay higher wages; and, finally, that existing relations between freight rates and commodity prices do not warrant a reduction of rates.

It would seem, therefore, that if there is any justification for making general changes in either railway wages or railway rates it must be found in the profits the railways are making. It has been accepted, whether wisely or not, as a principle of regulation that rates should be so fixed that the railways will be able to earn as an annual average only a so-called "fair return." It may, however, be contended with much force by railway employees that if, owing to increased efficiency of operation, the net operating income of the railways over a period of years exceeds a "fair return," they are as much entitled to benefit from the increased prosperity of the railway industry through higher wages as the shipping and traveling public is to benefit from it through reduced rates. And it is easily demonstrable that the increase in the net operating income of the railways which has occurred within the last four years has been due almost entirely to more efficient operation, including more efficient work by the employees.

But have the railways as a whole, or in any district, yet earned a net return which would warrant either an advance in wages or a reduction of rates? The Interstate Commerce Commission in 1920 made a tentative valuation of the railways of each large territory. It then held that a fair return on this would be 6 per cent, which was subsequently reduced to 5¾ per cent. The railways never have accepted this tentative valuation as large enough. Even accepting it as a basis, however, is there any warrant for changes in wages or rates merely because of the amount of net return being earned?

In the first six months of 1926 the eastern railways (including those in the Pocahontas Region) earned at the annual rate of 6.56 per cent upon their tentative valuation, including capital expenditures to date. But in the entire period since the tentative valuation was made they have failed by over 479 million dollars to earn what the Interstate Commerce Commission has held to be a fair return, the net return on their tentative valuation since September 1, 1920, having averaged only 5.03 per cent. The railways in the southern district have been relatively the most prosperous, and in the first six months of this year earned at the annual rate of 6.63 per cent on their tentative valuation, but in the entire period since the tentative valuation was made they have failed by over $73,000,000 to earn a fair return upon it, their average annual return having been at the rate of 5.44 per cent. The western lines in the first six months of this year earned on their tentative valuation at the annual rate of only 4.44 per cent. Since their tentative valuation was made they have failed by over 725 million dollars to earn a "fair return," their average annual net return on the tentative valuation having been only 4.43 per cent. The railways of the country, as a whole in the first six months of this year, earned at the annual rate of 5.68 per cent on their tentative valuation, but since 1920, when the tentative valuation was made, they have earned $1,277,600,000 less than a fair return on it, their average annual return having been only 4.82 per cent.

The prevailing general tendencies in the railroad industry are sound. The efficiency and economy of operation are constantly increasing. In consequence the net return earned is increasing. In the long run, an increase of net return should be accompanied by either advances in the wages of employees, or reductions in the rates paid by the public, or both; and, as the figures

above given demonstrate, during the last three years, while the net return has been increasing, wages actually have been slowly increasing while rates have been slowly declining. Unfortunately, the fundamental economic reason why an increase in the net return earned by the railways tends to lead to both higher wages and lower rates is not generally understood, and, therefore, the process is constantly in danger of interruption. The main thing that makes possible increases in the economy of operation is the investment of capital in such ways as to cause savings in labor, materials and fuel. In order that in the long run the railways may be able to raise and invest adequate capital, they must earn an adequate net return. It is true that within recent years, while earning an inadequate net return, they have invested a large amount of new capital, but of all the new securities issued by them since 1920, 90 per cent have been notes and long term bonds which have increased their indebtedness and fixed charges.

If they are to raise adequate capital in future they must do a larger part of their financing by the sale of stock, and they will be unable to sell a sufficient amount of stock unless many of them can earn larger returns and pay larger dividends. It must be considered, in this connection, that the present net return is being derived from a record-breaking freight business, and that if, on the average, year by year, the railways of any district are to earn a fair return, they must in good years earn more than this to compensate for the fact that in poor years, as in the past, they will earn less.

On sound principles of railway economics the net return that has thus far been earned by the railways of any district does not warrant either advances in wages or reductions of rates.

The Interstate Commerce Commission in regulating rates should consider the relative needs and rights of the shipper and traveler, the investor and the railway employee. Likewise, an arbitration board, in considering proposed changes in wages, should consider the interest and rights of all these three classes. If the arbitration board which is to determine the controversy between the eastern railways and their conductors and trainmen does this it will be difficult for it to make any wage award which will result, directly or indirectly, in reducing railway net return or in making necessary advances in rates.

"A" Rails Versus Increased Discard

IT HAS long been recognized by rail manufacturers and users alike that the poorest steel is found in the top of the ingot. For this reason rail specifications require that "sufficient discard shall be taken from the ingot to insure freedom from injurious segregation and pipe."

Yet, half of the failures that occur in rails today are found in "A" rails, or those immediately below the discard. The obvious remedy is that the amount of the discard should be increased, and this has long been advocated by many railway officers and not a few steel men.

One suggestion that has come from the consideration of this problem is that the amount of discard should be increased arbitrarily from the prevailing mill practice of 9 per cent to 25 per cent; another suggestion is that in addition to the usual discard the metal now going into the "A" or top rails should also be discarded, giving a total discard approaching, but slightly less than, 25 per cent for all but the heaviest sections of rails. In attempting to put these suggestions into practice, however, the rail manufacturers and the railways have come to a practical impasse.

It is evident that any increase in the amount of discard, with its corresponding reduction in the output of rails, adds to the cost of producing these rails, the amount of this increase depending on the use that is made of the metal discarded. Spurred on by their desire to avoid the laying of defective rails in their tracks, the roads have looked for outlets for this material among the products that they themselves use. Out of this search has come the suggestion that the mills roll into tie plates for the roads the steel that is now going into the "A" rails. That the demand for tie plates is sufficient to utilize all of the steel now going into the rails of 100 lb. section and over and thereby avoid the throwing of any of it back on to the manufacturers is shown by the figures given by C. W. Gennet, Jr., in his discussion of this subject on a following page, wherein it is stated that 450,000 tons of steel tie plates were rolled last year, while the total quantity of "A" rails rolled of 100 lb. and heavier section was 245,000 tons, or slightly more than half enough to meet the existing demand for tie plates.

In taking this question up with the mills the roads have been confronted with the addition of a premium of $2 per ton not only on the "A" rails or the additional metal that would be discarded, but also on the rails that would be accepted in the usual course. Since an average of less than one-sixth of the rails rolled are "A" rails, the addition of this penalty on the tonnage of rails in the entire heat is equivalent to a premium of more than $12 per ton upon the material rolled into tie plates, over and above the market price for the tie plates themselves, which price is itself somewhat above that of rails. The magnitude of this premium has been sufficient to discourage the diversion of the "A" rails into tie plates, and has led to their continued rolling into rails.

The entire controversy turns on the justification of this premium. The mills have as yet offered relatively little evidence in support of the premium, while the roads feel that it is unwarranted if the manufacturers would make a proper effort to utilize the discard, pointing to the progressive practice in one mill where nearly twice the usual discard is taken and this additional discard, together with the lower four per cent of the original nine per cent discard, is rolled into other products for which it is suitable, in this way offsetting, in large part at least, the mill losses and the cost of handling the additional discard by the added price which is secured from approximately half of the original discard, which would otherwise be remelted.

To say the least, the mills have not yet convinced their customers, the railroads, of the necessity for this added charge, which, if spread over the more than 2,000,000 tons of rails purchased annually, will add more than $4,000,000 to railway maintenance expenses. The situation is complicated by the fact that the rail market is not a "free" one in which prices are fixed by active competition and market conditions. Because of this limitation upon the freedom of action of the roads, they have only the alternatives of paying the premium quoted or taking the "A" rails. The fact that, with three or four exceptions, they have not yet paid the premium is evidence of their unwillingness to do so, as a result of which the "A" rails are continuing to go into track and failures of them are continuing to occur.

The situation is an unfortunate one, and suggests that the rail manufacturers, in view of their control of the market for a material so directly related to safety of travel, should either give their customers more convincing evidence of the justification for their charges or fix their charges on some other basis.

Competition in Railway Service

THOSE who read the Interstate Commerce Commission's decision authorizing the Southern Pacific to extend its lines into the Rio Grande valley from Falfurrias, will be reminded of the familiar platitude that there is no longer competition among the railways. At the present time there are going on in Texas two important railway building campaigns, one in the western part of the state and one in the extreme southern part. Not so many years ago the statement used to be made that Texas was overdeveloped from a railway standpoint, so that there was not enough business to support so much railway mileage. More recently the development of the petroleum industry and accompanying enterprise of other nature has brought great prosperity to the state and to the railways that serve it. However, it is of particular interest that the railway developments in both western Texas and the Rio Grande valley are not due to petroleum, but to agriculture. The point, however, is that the railroads are competing for entrance into the two territories and there is no question that the competition is most acute and is in every way similar to that of any competitive business enterprises in their struggle to get the business.

In the case of the Rio Grande valley the two competitors are the Missouri Pacific and the Southern Pacific. The valley is in some respects a peculiar region. About ten years ago the place was a desert and the National Guard troops who camped at McAllen, Mission or other places in the valley at the time of the difficulties with Mexico, brought back most adverse reports of the country.

The Gulf Coast Lines, built in the interest of the old regime of the St. Louis & San Francisco, had extended a line up the valley from Harlingen to Samfordyce. The Gulf Coast Lines, later becoming independent, were well operated and soon became so prosperous that the Missouri Pacific was willing to pay $116 a share for the stock. One reason for prosperity, but not the only one, was the gradual development of the Rio Grande valley. This was due to two things—irrigation and the extreme southern location. These enable the region to grow almost anything, including particularly citrous fruits and vegetables, and to have the latter ready for northern markets as early as February and March, at resulting very satisfactory prices. The region developed very rapidly and now looks so promising that the Southern Pacific desires to extend its recently acquired San Antonio & Aransas Pass line into it.

A feature at present secondary is that this proposed line will be extended across the Rio Grande river to a connection with the Monterey-Matamoras line of the National Railways of Mexico. How important this may be is a question. The Matamoras branch has rather poor physical characteristics. The Texas border connecting points at present include Brownsville (Matamoras), Laredo (Nuevo Laredo), Eagle Pass (Piedras Negras) and El Paso (Juarez). Of the business moving by rail between the United States and Mexico, almost three-quarters moves through Laredo and thence by the International-Great Northern (a Missouri Pacific subsidiary) and via San Antonio. The unsettled conditions in Mexico have helped to reduce the quantity of Mexican business. It is apparent, therefore, that the agricultural development of the Rio Grande valley is for the present the more important attraction.

Nor can one suppose that the competitive strategy of the Southern Pacific and the Missouri Pacific in southern Texas has attained its ultimate importance. The National Railways of Mexico have control of the Texas-Mexican, which extends from Laredo across southtern Texas to the coast at Corpus Christi. There are reports from time to time that the Southern Pacific or the Missouri Pacific is seeking to acquire this line. Whatever happens, the platitude that there is no longer competition in railway service has again been proved wrong.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Laws Relating to Payment of Wages, by Lindley D. Clark and Stanley J. Tracy. U. S. Bureau of Labor Statistics Bulletin No. 408. Railroads, p. 38-40, 138-139, 147-148. 157 p. Pub. by Govt. Print. Off., Washington, D. C., 50 cents.

National Wealth and Income. Report, by U. S. Federal Trade Commission. Presented in two parts: part I, "National wealth" including valuation of railroads and other public service enterprises, p. 43-47, and ownership of corporations, p. 144-161; part II, "National income" including a chapter on transportation and communication, p. 269-305. Figures from 1912-1922-23. U. S. Cong., 69th, 1st sess. Senate Doc. No. 126. 381 p. Pub. by Govt. Print. Off., Washington, D. C., 50 cents.

A Preliminary Abstract of Statistics of Common Carriers for the Year Ended December 31, 1925, by U. S. Interstate Commerce Commission." . . . contains summaries by districts and is intended primarily to make available as promptly as possible certain totals not obtainable from the monthly or special reports of carriers." p. 4. 28 p. Pub. by Govt. Print. Off., Washington, D. C., 15 cents.

Railway Mileage by States, December 31, 1925, compiled by Bureau of Railway Economics. Summary of mileage operated classified as to mileage operated in each state. 56 p. Pub. by Bureau of Railway Economics, Washington, D. C., *Apply.*

The Wage Policies of Labor Organizations in a Period of Industrial Depression, by V. J. Wyckoff. A study of several unions during the years 1920-1922. Discussion of government control of railroads, p. 12-14, and of Brotherhood of Railroad Trainmen, Chapter III, p. 20-29. Johns Hopkins Univ. Studies in Historical and Political Science, series XLIV, No. 3. 116 p. Pub. by Johns Hopkins Press, Baltimore, Md., $3.00.

Periodical Articles

The Silent Revolution in Railroading, I, by F. S. Tisdale. On the work of the Regional Advisory Boards. Nation's Business, September, 1926, p. 13-16.

Stop! Look! Listen! The Shareholder's Right to Adequate Information, by Prof. William Z. Ripley. A critical examination of the reports issued to stockholders by large corporations including railroads. Reprinted in part in Annalist, August 27, 1926, pages 267-269 under second part of title. Atlantic Monthly, September, 1926, p. 380-399.

Stories of Packingtown, I, by James E. Poole. Chicago's history with particular reference to the history of the meat transport and packing industry there. Illustrated from photographs and old wood cuts. Country Gentleman, September, 1926, p. 3-4, 70-74.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Experience With the Positive Meet

NEW LONDON, CONN.

TO THE EDITOR:

J. L. Coss, writing in the *Railway Age* of August 14 and discussing the article by General Manager Droege, assumes too readily that conditions on the New York, New Haven & Hartford are particularly easy, and that the success of the positive meet here gives no assurance that it can be employed with satisfaction elsewhere. If anyone will look at the map of the New Haven system and the schedules of the trains, passenger and freight, it will be seen that we are up against a very stiff proposition, as far as connections are concerned; but we operate under the positive meet system on our single track lines and have no trouble therewith.

Rule 88 of the New Haven book of rules reads: "At meeting points between trains of the same class the west or southward train must take the siding. At meeting points between extra trains, the west or southward train must take siding." This disposes of the second paragraph of Mr. Coss's letter. Whenever an incident occurs which disrupts traffic, we do exactly what he does under superiority by direction; that is, put signals on trains. This means, of course, that the dispatcher must fix a meeting point for the various sections, unless he desires the opposing train to wait at the schedule meeting point. There is no difference, whatever, in the handling of a condition of this kind under either system.

I have worked various positions from telegraph operator to trainmaster, and also in actual road service, under both the superiority by direction system and the positive meet system, and I have never seen anything, in practical operation or otherwise, to equal the positive meet as handled on this road.

I recently had occasion to travel over a railroad where, between 12 midnight and 12 noon, eastward trains were superior to westward trains, while between 12 noon and 12 night westward trains were superior; while the timetable contained 37 exceptions affecting about 50 trains, reversing the superiority by direction between certain stations as regards those trains alone. It appears to me that the positive meet is much safer, taking into consideration the hazard incident to the superiority-by-direction feature, especially when there are so many exceptions noted in the timetable. This is not peculiar to any one railroad.

I seriously question whether reasonable economy of operation is accomplished on a railroad which permits the operation of six trains at any one time in a territory 50 or 60 miles long, without means of communication within that distance. It appears to me that leaving the superiority-by-direction feature out of the case entirely, if there were means of communication the dispatcher could oftentimes help the inferior train, if he had the facilities to do so.

Meeting points expressed in heavy black figures on timetables of roads operating under superiority by direction do not mean much; whereas the full-face figures on New Haven timetables mean exactly what they show. There is no possible chance under the positive meet of any brother attempting to "smoke in" to a station or siding on short time against a superior train.

To my mind the positive meet is as far ahead of superiority by direction as the movement of trains on single track solely by signal indication is ahead of the written train-order.

W. S. CARR,
Headquarters Trainmaster, New York, New Haven & Hartford.

Federal Control Gave Emphasis to Fire Prevention Work

TO THE EDITOR:

W. S. Wollner's article in the June 5 issue of the *Railway Age* on "Education in Fire Prevention" contains excellent suggestions which railway officers may well consider with profit to their companies but one feature should not pass without comment. He implies that the Railroad Administration neglected the human element in fire prevention while large sums were spent on physical improvements. Federal control has been charged with much and credited with little but it established for the first time on a large part of the Class 1 mileage the idea of fire prevention and the need of personal interest to make it effective. As a direct result the recognition and progress of fire prevention under private ownership is an interesting feature of railroad development which has had practically no publicity. Officers used to regard fires as they did wrecks and washouts, casualties to be taken as they came. The modern officer with a broader vision has learned to appreciate that reduced fire losses mean reduced operating expenses.

Mr. Wollner may be right regarding the Pacific coast but I helped supervise for the Administration's fire protection section the work on numerous roads east of Salt Lake and know that it was evident almost from the start that the corporations would not authorize improvements involving much expenditure. Thereafter suggestions from the section were confined to prevention and instances where an otherwise good protective installation lacked some detail to make it efficient. A single case where considerable money was spent inadvisedly was put through without the approval of the section. The emphasis put on developing personal effort and education by the Administration was shown by Section Bulletin No. 7.

PAUL A. BISSELL.

BULLETIN 408 of the Bureau of Labor Statistics, Washington, recently issued, contains a digest of laws dealing with state control of wage payments, including summaries of decisions of courts construing legislation of this class. The bulletin can be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 25 cents a copy.

WOMEN STOCKHOLDERS of the Atchison, Topeka & Santa Fe are more numerous than the men. Of the individuals owning stock 25,939 are men, owning a total of 1,375,934 shares, and 30,083 are women, owning 995,375 shares. Of the stockholders 56,022 are individuals who own 2,371,291 shares of stock or 66 per cent of all stock outstanding. The remaining 34 per cent of stock is held by fiduciaries, estates, insurance companies, educational and scientific institutions, religious organizations, savings banks, trust companies and business firms.

Looking North Toward the New Wye Bridge

Hanging Girder Ends from Above Eliminates Necessity for Piers

Burlington engineers meet difficult problem in constructing bridge for a wye track at Chicago

By G. A. Haggander

Bridge Engineer, Chicago, Burlington & Quincy, Chicago

AN unusual method of providing an intermediate support for bridge spans in a location that did not permit of the construction of a pier or bent was adopted by the Chicago, Burlington & Quincy for a structure carrying a wye track over the tracks of three other railroads. The site was one which imposed unusually severe limitations as to clearances, headroom, curvature and grades, and it was only through the adoption of an unusual expedient that it was possible to develop a practical design for the structure.

Southeast End of the Wye Bridge Showing the Gallows Frame and the Eye-bar Hangers

This wye track is an interchange facility at the crossing of the Burlington and the Pennsylvania, the Baltimore & Ohio Chicago terminal and the Chicago Junction near Western Avenue and 21st St., Chicago. The four-track main line of the Burlington is carried over the four-track line of the Pennsylvania (Panhandle) and the double track lines of the two other roads on a through plate girder bridge. The Burlington line runs in a generally east and west direction, while the tracks of the other roads run north and south. In the southeast angle of the intersection the Burlington has a double-track wye providing a connection from its main line and the Western avenue yards to a lead to the so-called "lumber district," known as the lumber district tracks which are located east of and parallel to the Chicago Junction tracks. These wye tracks are on a descending grade from the level of the Burlington main tracks to the level of the main tracks of the railroads which cross underneath the Burlington at this point, the length of this descent being limited by the requirements of adequate underclearance at an overhead bridge of the Chicago Rapid Transit line located about 900 ft. south of the Burlington main line. North of this point the lumber district tracks are carried on an embankment supported on both sides by retaining walls.

There is also another wye track in the southwest angle which connects the Burlington tracks with those of the Pennsylvania. However, neither of these wye tracks afforded a satisfactory means of transferring stock trains coming in from the west over the Burlington to the Chicago Junction for movement to the Union Stock Yards because the use of the southeast wye necessitated a reversal of the direction of the trains while movement over the southwest wye entailed the crossing of the Pennsylvania and the Baltimore & Ohio tracks at grade. It was therefore decided to construct a new single-track

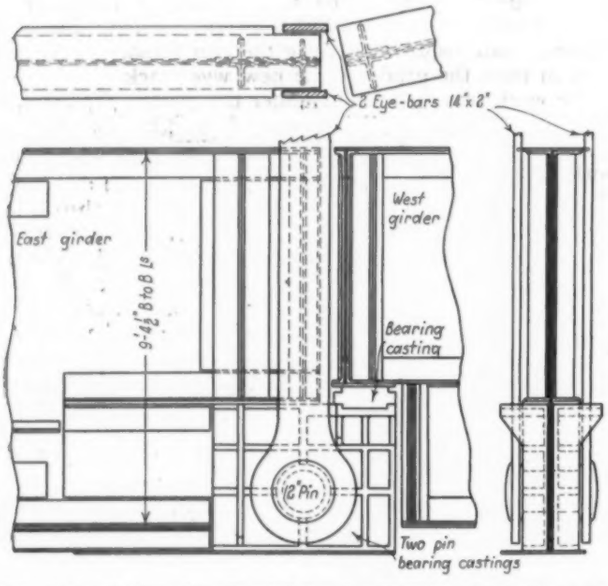
wye in the southwest angle, crossing over the eight tracks of the Pennsylvania, the Baltimore & Ohio and the Chicago Junction on a bridge to a connection with the Burlington lumber district tracks from which a crossover would afford a direct connection to the Chicago Junction tracks without interference with train movements on either the Pennsylvania or the Baltimore & Ohio.

Conditions at the Site Impose Severe Limitations

The physical conditions of the site as outlined above imposed severe limitations on the layout of this new wye track and the bridge to carry it over the lower level tracks. It was necessary to provide a headroom of 18 ft. over the tracks of the other roads and a vertical clearance of 17.25 ft. under the bridge of the elevated railroad. The connection of this wye track to the elevated lumber district track had to be made without shifting the latter more than two feet because of the limited width of the embankment between retaining walls.

These limitations fixed the curvature of the new wye track at 13 deg., required the lowering of the Chicago Junction tracks 2 ft., and those of the Baltimore & Ohio 8 in. They also made it necessary to lay out the grade of the wye track entirely on vertical curves with an average grade 2.5 per cent for the first 400 ft. north from the elevated railroad bridge and imposed the necessity for a bridge floor of minimum practical thickness.

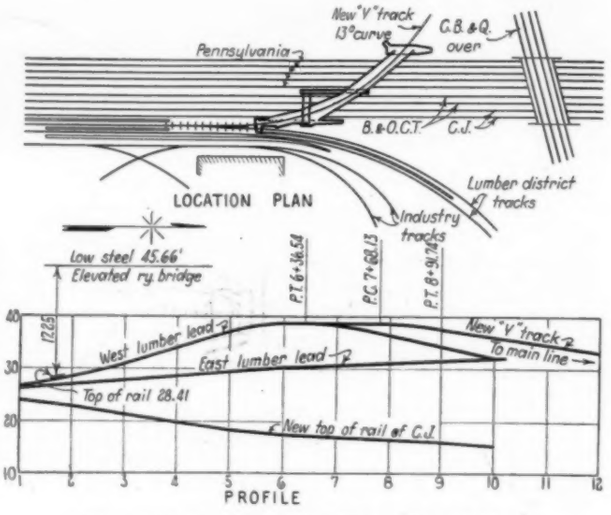
Because of the close spacing of the lower level tracks, only one line of intermediate supports could be secured for the new bridge, namely, on the property line between the rights-of-way of the Pennsylvania and the Baltimore & Ohio. The span length from the center support to the west abutment did not offer any unusual difficulties in design or construction as it consisted of a through plate girder span 117 ft. 3 in. in length with floor beams 24 ft. 7 in. long. In the east span the north girder offered no particular problem, its length being 119 ft. The south girder of the east span, however, presented a perplexing problem as it would have been 175 ft. long if a single span were used and the floor beam length would have been 35 ft. This would have necessitated a prohibitive floor depth and the use of a truss in place of a girder and it would have been impossible to provide satisfactory bracing for this truss.



How the Girders Are Carried by the Two Eye-Bar Hangers

Hang Girders from Overhead Frame

In order to reduce the floor beam length a plan was evolved, using two girders instead of one on the south side, and supporting their intermediate ends by means of eyebars suspended from an overhead structure. This not only reduced the length of these girders to reasonable proportions, approximately 82 ft. each, but by placing these girders approximately parallel to the chords of the track it was possible to reduce the length of the floor beam to a maximum of about 24½ ft.



Map and Profile of the New Wye Bridge

The overhead support for these two girders consists of a gallows frame made up of two bents and a pair of cross girders. One bent rests on top of the east abutment and the other on a pier between the Pennsylvania and Baltimore & Ohio tracks. These girders have a span of 61 ft. center to center of bents and are spaced 10 ft. center to center as are the columns of the bents into which they are framed. The 14-in. by 2-in. eyebars which carry the bridge girders are suspended from these cross girders by means of a 12-in. pin and a steel casting supported from loading beams framed between the two gallows frame girders.

The two bridge girders are supported from the eyebars by means of two bearing castings which engage another 12-in. pin. The lower corners of the girders are notched to fit over these castings which are rectangular in form and are securely riveted to the west girder. A suitable bearing is also provided on these castings for the east girder. The lower ends of the eye-bars are protected by a steel box which has been filled with asphalt to allow slight movement.

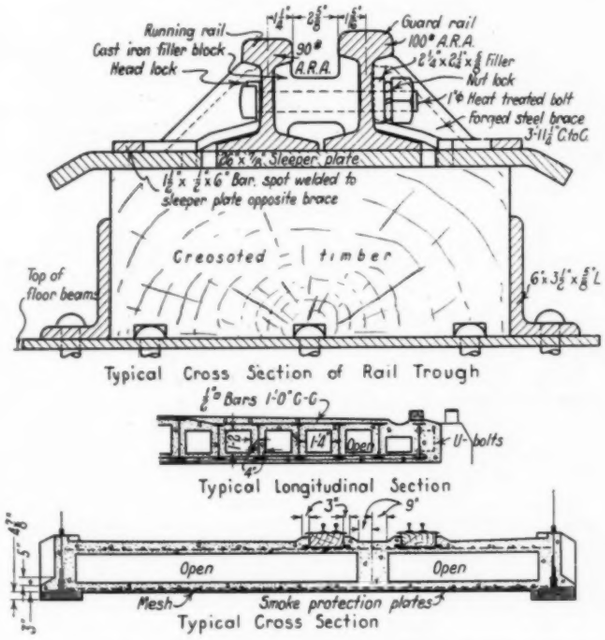
An effective means of providing tower bracing for the gallows frame and of reducing the unsupported column length of the west bent which is 56 ft. 2 in. high, was developed by introducing a bracket truss cantilevered from the west bent to a connection with the web of one of the bridge girders.

The bridge girders are not of unusual design, the only special detail being the suspension at the eye-bar support. The heaviest girder weighs 64 tons. The girders are fixed at the west abutment, the only expansion joint being on the east abutment for the north girders and at the hanger for the south girders. The

movement of the top of the center bent is taken care of by flexibility in the columns.

Floor System of Special Construction

The floor system consists of transverse I-beams 2 ft. center to center having 4 lines of 6-in. by 3½-in. angles riveted to the upper side to form two troughs on a line with the track rails to hold creosoted longitudinal timbers about 9 in. by 24 in. in section on which continuous steel plates 26 in. by ⅞ in. were mounted to serve as rail supports. Inside guard rails were provided across the entire bridge to prevent wear on the running rail and to reduce the chance for derailment. The guard rails are of heavier section than the running rails and have their tops higher than the latter to better serve this purpose. The running rail is of manganese steel. The two rails are held together by bolts through cast iron fillers and are braced by forged rail braces at inter-



Details of the Rail Support and the Floor Construction

vals of about four feet. The rail braces are backed by steel bars spot-welded to the supporting plate.

On account of the limited head room under the bridge and the density of traffic on the tracks below, special care was taken to provide a structure that would insure low maintenance costs, and the entire floor below the track level was encased in concrete which in turn is protected over the tracks by metal blast plates. The weight of the concrete encasement was reduced by introducing hollow spaces 16 in. by 18 in. in section between the beams. Particular care was taken to slope all portions of the deck toward the ends of the bridge where downspouts were provided to insure rapid drainage and prevent the ponding of the water. The top of the deck is protected by two coats of asphalt emulsion.

The blast protection is provided for a width of four feet over the center line of each track below. The protection of the girder flanges consists of flanged cast iron plates fitting around the under side of the girders and filled with concrete while the protection for the floor beams consists of copper bearing steel plates suspended from the beams. These plates served as the bottom forms for a portion of the concrete encasement.

Slow Speed Operation Reduces Effect of Impact

The bridge was designed for Cooper's E-65 loading, according to the general specifications for steel railway bridges of the American Railway Engineering Association except that the allowance for impact was taken as half that provided for in the specifications because of the restricted speed at which trains must operate over this bridge.

The abutments are of the cantilever type with reinforced stems and toe and heel extensions of the footing. The sharp skew of the bridge introduced rather complicated details for the girder bearing seats, back walls, etc. The center bent is partly encased in concrete to protect the columns from collisions with derailed cars.

The center bent of the bridge is supported on concrete caissons sunk to rock by the Chicago method. The abutments are supported on 40-ft. cypress piling driven to refusal. The concrete was proportioned in accordance with the Abrams method with the co-operation of the Portland Cement Association. The east abutment was constructed during freezing weather and the aggregates and water were heated by means of live steam and the concrete in forms protected by means of tarpaulins and salamanders.

Work on the bridge was started on October 1, 1925, and the structure was put in service on May 28, 1926. The sub-structure was constructed by the Underground Construction Company of Chicago, the steel work was furnished by the American Bridge Company and was erected by the Kelly-Atkinson Company which also had the contract for the concrete encasement and certain other incidental work. The R. C. Products Company of Cleveland, Ohio, furnished concrete cribbing for a retaining wall required to raise the east lumber district track to meet the grade of the new wye track.

The work was carried out under the general direction of A. W. Newton, chief engineer of the Chicago, Burlington & Quincy, the designs being prepared and the work carried out under the supervision of the writer. The preparation of the plans which was of an exceedingly complicated character on account of curvature, skew and grades, was done under the immediate direction of L. W. Skov, office engineer.

Passenger Business Losses Cited

THE passenger business of the railways in Colorado and Utah has been cut almost in half by the competition of the motor bus and the private automobile, according to F. A. Wadleigh, passenger traffic manager of the Denver & Rio Grande Western, testifying at the Interstate Commerce Commission's motor transport investigation at Denver, Colo., on August 25. Mr. Wadleigh submitted figures showing the passenger business of the Denver & Rio Grande Western as proof of this statement. The D. & R. G. W. handled 987,959 passengers in Colorado in 1920, and only 459,627 passengers in 1925. Its passenger revenues in the state of Colorado in 1920 were $3,146,000 and in 1925, $1,732,000. During the five-year period the population of Colorado increased more than 72,000.

In Utah the D. & R. G. W., carried 363,558 passengers in 1920, and 142,712 in 1925, the passenger revenues declining from $1,133,235 in the earlier year to $614,427 last year. The population of Utah increased more than 39,000 in this period.

Registration of automobiles in Colorado in 1920 was 119,966, Mr. Wadleigh said, and in 1925 had increased

to 221,513. Motor vehicle registrations in Utah increased from 37,578 in 1920, to 79,207 in 1925.

Railways Operate Buses

Mr. Wadleigh described the arrangement under which the Colorado & Southern and the Denver & Rio Grande Western purchased an interest in a bus line operating between Denver and Pueblo, the buses augmenting the train service of the two lines. He stated that the Rio Grande is operating a bus line also between Grand Junction, Colo., and Montrose, Delta and Somerset.

Bus and Rail Fares Compared

Testifying as to the comparative rates of fare of the railways and buses, Mr. Wadleigh quoted the following as being in effect from Denver: Salt Lake City, Utah, rail, $25.59, bus, $12.50; Kansas City, Mo., rail, $22.76, bus, $12.50; Topeka, Kan., rail, $16.31, bus, $11.65; Chicago, rail, $37.28, bus, $25.00; Los Angeles, Cal., rail, $49.29, bus, $25.00; Detroit, Mich., rail, $47.09, bus, $32.00; Amarillo, Tex., rail, $16.75, bus, $10.00; St. Louis, Mo., rail, $32.80, bus, $19.50.

In response to questions of Examiner Flynn, Mr. Wadleigh said that he did not believe the bus lines quoting the above rates did any considerable intrastate business, confining their work to that of interstate passenger carriers. The volume of the business they secure is large, he testified.

In closing his testimony, Mr. Wadleigh said that in his opinion the state utilities commission should regulate buses as well as trucks.

The effect of motor truck competition in freight haulage on the Colorado railways was described by B. W. Robbins, general freight agent of the Denver & Rio Grande Western. Mr. Robbins testified that for the 12 months ending February 28, 1921, the less-than-carload freight shipments handled between Denver and Trinidad aggregated 19,967 tons, the revenue derived from this business being $191,035. Similar shipments handled by the D. & R. G. W. in the 12 months' period ending February 28, 1926, aggregated 13,110 tons, with a revenue of $139,425. The loss he attributed to the competition of truck lines operating in this district.

In the Palisade, Grand Junction, Montrose and Somerset district during the same period, Mr. Robbins testified, the l. c. l. business of the D. & R. G. W. declined from 3,922 tons in 1921 to 1,267 tons in 1926, the freight revenue decreasing from $33,003 to $11,953.

J. E. Buckingham, general freight and passenger agent of the Colorado & Southern, testified that on the Denver-Fort Collins line of the C. & S. there had been a decrease in the number of passengers handled in 1925, as compared with 1920, of 708,161, passenger revenues declining $1,436,869.

Ernest Carter, traffic manager of the Laramie, North Park and Western, testified that his line, extending from Laramie, Wyo., into Colorado, was in competition with six bus lines and a number of truck lines during the summer months, and that the earnings of the road as a result have been insufficient to pay expenses.

Bus and Truck Operators Testify

Following the railway witnesses, a number of operators of buses and trucks testified as to the service they render. Several of the operators admitted that they were operating without certificates in the state of Colorado, although doing an intrastate business.

Robert W. Taggart, president of the Yelloway bus line, described the operations of his company, whose lines extend now from Chicago to Kansas City, Omaha, Denver and Los Angeles. As to the reliability of his service, Mr. Taggart said that there had been no instance in which a passenger on his buses had not been taken through to his destination.

Liability of Bus and Truck Companies Questioned

Ernest H. Johnson, assistant auditor and acting investigator of the Public Utilities Commission of Colorado, testified regarding and submitted some of the contracts of bus and truck companies now operating to show that they are not liable for damages. In answer to this charge, several of the bus and truck operators declared that in general, operators on the highways now are fully insured against damage to freight or injuries to passengers.

Several operators testified as to the cost of operation of buses and trucks, putting the bus operating cost at approximately 27 cents a mile, and the cost of operating a two-ton truck at 16 to 20 cents a mile. The best results financially have been obtained by bus and truck operations over short distances, it was testified.

The hearing at Denver adjourned on August 26, to be resumed at Detroit, Mich., on September 1. Following the Detroit hearing, other hearings will be held at Boston, Mass.; New York; Asheville, N. C.; Dallas, Tex.; and Kansas City, Mo.; with a final hearing at Washington, D. C., on October 25.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended August 21 amounted to 1,088,791 cars, an increase of 6,262 cars as compared with the corresponding week of last year and of 40,546 cars as compared with 1924. As compared with the preceding week, however, there was a decrease of 20,766 cars. Loading of grain and grain products, coal and forest products showed a decrease as compared with last year, as did the totals for the Alleghany and Southern districts, while other classes of commodities and other districts showed increases. As compared with 1924 there were increases in all districts except the Central Western and in all classes of commodities except grain and products and livestock. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED SATURDAY, AUGUST 21, 1926

Districts	1926	1925	1924
Eastern	257,846	255,258	225,450
Allegheny	216,960	217,545	198,320
Pocahontas	58,656	55,660	46,292
Southern	149,358	151,220	139,816
Northwestern	168,516	166,441	141,904
Central Western	159,200	152,717	162,221
Southwestern	78,255	81,154	68,757
Total Western districts	405,971	400,312	372,882
Total all roads	1,088,791	1,079,995	982,760
Commodities			
Grain and grain products	52,315	55,542	61,532
Live stock	29,935	29,846	34,174
Coal	185,810	201,125	160,267
Coke	11,556	9,777	7,230
Forest products	70,067	71,002	69,290
Ore	75,057	60,266	48,412
Mdse. L.C.L.	265,577	260,225	243,927
Miscellaneous	398,474	392,212	357,928
August 21	1,088,791	1,079,995	982,760
August 14	1,109,557	1,064,476	953,408
August 7	1,083,199	1,052,518	941,407
July 31	1,102,590	1,045,626	945,613
July 24	1,085,450	1,033,519	926,309
Cumulative total, 34 weeks	33,563,278	32,470,570	30,513,249

The freight car surplus for the week ended August 14 amounted to only 171,269 cars, a decrease of 8,502 in a week. This included 40,700 coal cars, 97,194 box cars and 10,238 refrigerator cars.

Some Railroad Problems*

Various aspects of the railroad situation and a hopeful view of the future

By George M. Shriver
Senior Vice-President Baltimore & Ohio

THE growth, the progress in population and wealth of the country have proceeded with, or rather in the wake of, railroad construction. Other and important transportation agencies are now available, but for the long haul required for the vast agricultural areas and the volume of output of the great industrial centers the railroad will continue all-important, and if agriculture, industry and commerce are to grow apace with the expanding population, so must the railroads continue to be adequately maintained, extended and developed. This will call for large additional capital expenditures in the future. Will the income of the carriers be placed and maintained on a basis which will enable them to command the requisite additional capital? For in the last analysis suitable compensation to capital in the way of interest and dividends is just as necessary in the upbuilding of the railroads as is a fair and adequate wage to those who conduct its operations, or a fair price for the equipment, materials and supplies for its operation and maintenance.

An Estimate of Capital Requirements

Let us glance first at the approximate requirements of capital, and then to the basis and prospects for its future support. The railroad companies' requirements in the way of new capital will depend very largely on what the public may in turn require of them; and whether the railroads will be in position to respond to these requirements will depend on the measure of confidence and support the public accords these transportation agencies. What appears to be the minimum requirement of the carriers in the near future may be summarized as follows:

The average requirement for maturing obligations over the next five years may be roughly placed at $225,000,000. The average annual expenditures for additions and betterments for the past five years approximated $775,000,000. This makes a total of $1,000,000,000.

As against the total expenditure for improvements, there is the annual charge to expenses representing the proportional renewals, whether expressed in terms of depreciation or retirement, of, say, $200,000,000, which it may be assumed will be available for replacement purposes, and judging from what the railroads have found it practicable to appropriate annually from income for additions and betterments and retirement of obligations in the past, it may be fairly assumed that there would be available from this source in the future, say, $100,000,000. This makes a total of $300,000,000.

These contributions from income are made by two distinct classes of railroads: (1) Those with assured income who had available the necessary surplus after paying charges and reasonable dividends, and (2) those who had no other resource than their income with which to meet absolutely necessary additions to their property.

This leaves a net annual requirement for new capital of, say, $700,000,000, for which the interest on approximately $500,000,000, and some additional interest due to increase in rate on $200,000,000, will constitute a new charge and expense. If we concede that process over a period of five years you can see there will be added a new and additional requirement in the way of net earnings, anywhere perhaps from $125,000,000 to $160,000,000 a year.

Expense of Grade Crossing Elimination

In earlier periods before the days of automatic and distant crossing signals, the numerous railroad grade crossings where trains were passing at a speed of from 25 to 40 miles an hour were protected by gates or fences operated by hand. With the desire for safety and the continued insistence for more rapid travel, such railroad crossing at grades have been protected, at great expense, by interlocking and safety devices. In the meantime, however, and with a total of some 18,000,000 privately owned and operated passenger automobiles in this country capable of approaching any one of the thousands of grade crossings at a speed exceeding that maintained by the railroad trains 25 years ago, there is introduced a risk both to the traveler by highway as well as by train which must be considered and eliminated so far as possible. This condition can be remedied in part by legislative enactments placing the proper degree of responsibility upon the users of the highways and by reduction of the number of crossings to a minimum, but whatever relief is secured in this direction there will still be involved a large expenditure in the protection and elimination of grade crossings at the more important highways. So large an item is involved in this that clearly it must be shared by the federal, state, and municipal bodies, as well as by the common carriers, but even so there will of necessity fall upon the carriers a large new and additional capital expenditure.

I might cite in that connection the experience of one small railroad, of which I happened to be advised, which has some 50 miles of railroad within Metropolitan New York. In the state of New York they have recently passed a law under which the state and municipality join the railroads in grade eliminations, I believe on a 50-50 basis, and further extend aid in financing the project over a period of years. I understand the present bond issue authorized for this purpose is some $300,000,000. Under the law the state government has taken up the question of grade eliminations on this 50 miles of road, and to do all that is proposed in this first survey involves a total expense estimated at somewhere around $18,000,000, of which 50 per cent will have to be borne by the railroad. It so happens that to make this expenditure will add almost 100 per cent to the total capital invested in the railroad.

It is true this property is in a congested territory; however on that short mileage, as you can see, there will be a tremendous burden imposed, and yet the New

* From an address at the convention of the Railway Accounting Officers' Association, at Quebec, Canada, on June 9, 1926.

York law is recognized generally as a most favorable one.

In the state of New Jersey I believe the railroad is called upon to pay the entire expense of grade eliminations, whereas the state of New York not only purposes contributing 50 per cent of the cost but it undertakes to finance the railroad's proportion, to be reimbursed over a series of years.

Other Demands

There is a growing demand in large municipalities, and, at places, no doubt a degree of necessity, for electrification. With the increasing traffic, perhaps electrification will be necessary as a matter of economy where heavy grades are to be overcome and where this will solve the question of increased facilities in rugged country where additional tracks cannot be secured except at prohibitive cost, if at all.

The installation of automatic train control is pending, and unless there is a change in the legislation on this subject there will be required a large additional expenditure which must be met when and as such devices reach the point of practicability as to justify their general adoption and use.

The stress of unusual traffic in peak years has developed many points of weakness in yard and terminal facilities, and the need has arisen for their extension and modernization if there is to be realized the full economy in handling the constantly increasing train load with additional numbers of car units.

Billion Dollars a Year Needed

These and many other items that might be mentioned, taken in conjunction with the already demonstrated capital needs of over $700,000,000 indicate a billion dollars a year as the reasonable requirement of new capital if the railroad system of the country is to be maintained in harmony with its traditions, and be prepared to facilitate and not retard the progress of commerce and industry.

Can such a requirement be met, and can a justification for the needed financing be found? Perhaps I will be considered an optimist, but it is my personal view that the justification exists and that experience will demonstrate it can be found in the Transportation Act, and more specifically in that section of the act which states that the commission in the exercise of its power to prescribe just and reasonable rates shall initiate, modify, establish, or adjust such rates so that carriers as a whole will, under honest, efficient, and economical management, earn an aggregate net annual railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property held for and used in the service of transportation. What encouragement is there, it might be asked, when, after the recognition of Congress of the justness of carriers receiving a return of as much as 6 per cent on the value of their property, for the two years following federal control there was realized less than 3¾ per cent on the tentative value found by the commission in 1920, brought up to date year by year by the addition of the net annual increases in capital investment, and for the four succeeding years, when the Commission fixed 5¾ per cent as the permissible return, an average of slightly over 5 per cent (5.01 per cent) was realized.

Reasons for Failure to Earn a Fair Return

Personally, I am of the opinion that such a result is in no way attributable to the law or to the administration of it by the Interstate Commerce Commission.

When in 1920 the commission undertook to carry out the instructions of Congress they called on the carriers to present their needs and requirements. The carriers submitted their best estimate indicating the percentage increase in freight and passenger charges, which it was felt would meet the situation, including the necessity to provide for the wage increases awarded by the United States Railroad Labor Board, effective May 1, 1920, which award was also in pursuance of the requirements of the Transportation Act.

The commission's decision went far to meet the recommendations the carriers had made, and which it was believed by them would meet the situation. Unfortunately, the forecast had of necessity been based on the history of the preceding year, which included the peak of post-war activities, and the sudden and extensive decline in business in the Fall of 1920, which continued through 1921, prevented the realization which Congress had expected might result from the provisions of the Transportation Act. Further, it might be contended that the results for 1922, when there was realized by the carriers but 4.14 per cent instead of the 5¾ per cent fixed by the commission for the last ten months of that year as a fair return, indicates the weakness of this feature of the law, and this particularly having in mind the order of the commission reducing all freight rates 10 per cent, effective July 1, 1922. This reduction was made in the light of the fairly satisfactory returns the carriers had experienced in the latter part of 1921 and the early months of 1922, and upon forecasts urged by certain of the shippers as to prospective reductions in the cost of fuel, materials, etc. The railroads questioned these predictions and protested against any general decrease in charges, although they recognized the need of certain adjustments; indeed, they had themselves previously made extensive reductions in rates on certain commodities, notably farm products. This they had done voluntarily in recognition of the fact that the readjustment following the war conditions had borne perhaps more suddenly and severely on the agricultural interests, and there appeared a necessity for an adjustment in rates to encourage production and to aid the farmer in securing some of the curtailed world markets.

While the 10 per cent reduction in freight charges contributed measurably to the unsatisfactory results of 1922 as finally developed, other features, including the disturbed labor conditions, both with the railroads and the coal operations, were more largely to blame.

Progressive Improvement in Income

The railroad operations, however, for the past three years have been on what might be considered a normal basis—they include the peak year of 1923, the less prosperous year 1924, and what might be considered a fairly average year, 1925, with the result that the Class I carriers, including large switching and terminal companies, had an average earning of $1,035,812,742, with an average rate of return of 5.29 per cent. This return also is calculated upon the tentative value obtained by the Interstate Commerce Commission, increased so as to include the net amount of additions and betterments to property from January 1, 1920 to January 1, 1925.

For the year 1925 the reports show a net railway operating income of $1,136,984,243, indicating a return of 5.62 per cent.

Unquestionably this progressive improvement in the income of the railroads has had an important influence in the improved credit position of the companies—but more important than mere returns, which are affected by many conditions beyond the control of Congress or

the commission, is the underlying assurance Congress has given to investors in railroad securities that the commission will from time to time so establish rates that the carriers as a whole will earn an operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property.

Results of Better Operation

In connection with the larger income and improved return it is interesting to note that this had not come about as the result of increased charges or of increased business alone but very largely through better operations and economies effected. As a matter of fact, through constantly recurring adjustments in the rates, the rate structure today is much below that of 1921, and materially less than 1922 when the general 10 per cent reduction took effect.

In a recent statement Dr. Parmelee, director of the Bureau of Railway Economics, has shown the declining costs of transportation to the user, citing the average receipts per ton-mile since the peak level of 1921 as follows:

	Receipts per Ton—Mile
1921	1.275 cents
1922	1.177 cents
1923	1.116 cents
1924	1.116 cents
1925	1.098 cents

(An even lower present rate basis would be disclosed were it not for the fact that in 1925 a larger proportion of the traffic moved was of a higher class which was reflected in a higher average rate per ton per mile in that year.)

According to this comparison the saving to the shipping public in 1925 from reduced rates since 1921 was $733,000,000, or an amount equal to 64½ per cent of the net operating income of the carriers for that year. The earnings per passenger mile have also shown a substantial decline. In the meantime, the level of wages established by the Labor Board in 1921 and 1922 has been maintained, or adjusted upwards from time to time by action of the carriers.

In the light of these facts it is evident that much of the increased income is the result of economies in operations, which is confirmed by the change in transportation and operating ratios as follows:

	Transportation Ratio	Total Operating Ratio
1921	41.01	82.71
1922	38.67	79.41
1923	36.91	77.83
1924	36.34	76.13
1925	35.01	74.08

and more particularly demonstrated in certain efficiency factors, for which comparison is had for the first quarter of 1926 with similar periods in 1923, 1924 and 1925:

	1926	1925	1924	1923
Freight-car-miles per car-day	28.5	26.6	26.5	25.9
Net ton-miles per car-day	494	468	476	495
Net tons per train	728	717	692	692
Freight train speed—miles per hour	11.7	11.6	11.1	10.4
Net ton-miles per train-hour	8526	8282	7688	7180
Fuel consumption per 1000 gross ton-miles	175	178	194	213
Fuel consumption per passenger-train-car-mile	17.4	17.8	19.0	20.7
Percent unserviceable freight cars	6.7	7.9	6.9	8.9
Percent unserviceable locomotives	17.4	18.8	19.0	24.9

Elements which have contributed to these results are the new and improved facilities and equipment, shop and terminal facilities, involving large additional capital expenditures, and more particularly the product of management, furthered by the co-operation of an interested and enlightened body of employees. Not only have wage standards been maintained, but the costs to the shipper have been reduced, and at the same time more satisfactory financial returns have been realized by the carrier. Furthermore, the public has been accorded much better and more effective transportation service through an improved roadway and increased supply of more effective equipment.

Hoch-Smith Resolution

It is not to be overlooked that there are still pending important questions such as valuation, and consolidation, which will require continued earnest consideration and high statemanship in their disposition, and the equally important and perhaps more immediate problems involved in the Hoch-Smith resolution, directing the commission to make a complete investigation of the entire rate structure of the United States with the view of determining to what extent, if any, rates are unjust, unreasonable or unduly preferential in their relationship as between the country and as between localities, and the making of such changes, adjustments and redistribution of rates and charges as may be necessary to correct any defects found to exist.

While this resolution does not alter or minimize the provisions of the Transportation Act with respect to the railway operating income of the carriers, there is an implied suggestion looking to the reduction of certain basic rates, particularly as they apply to agriculture; and should such reductions eventuate on basic commodities moving in volume it will involve adjustments upwards on certain commodities or classes of traffic, else the revenues of the carriers cannot be maintained on the present relative basis, much less provide the full measure of return contemplated in the Transportation Act.

The potency of this situation emphasizes the great care with which the information and data which must govern the commission in its conclusion should be prepared and presented. Much of the work and study in this connection will devolve upon the railway accounting officers, and I am sure you will bring to it the careful thought and consideration necessary for the development and full portrayal of the facts so that the conclusions may be based on a clear and explicit presentation of the situation.

Having in mind how the existing rate structure has been built up through long years of competitive conditions to meet the necessities of the geography of the country and commercial requirements, coupled with innumerable adjustments, voluntary and under the orders of the commission, it is difficult to see how any radical changes can eventuate; nevertheless, the subject is so broad and the outcome of the study under the resolution so vital to the carriers, that it commands the very special consideration of all those in any way responsible for its disposition.

There was a meeting in Washington a few days ago in connection with this matter and representatives of the Accounting Officers' Association were called in consultation on the subject. I understand some differences arose as to how far the carriers could or should go in developing the situation and in making recommendations. I do not conceive it to be the duty, particularly of the carriers, to make recommendations; but I do feel it is the duty of their representatives to aid the commission in developing the essential facts in order to give it the fullest possible picture of the rate structure as to which Congress has propounded these questions. We have this law—this resolution of Congress—to which the commission must of necessity respond. It does not necessarily follow that as a result of this study rate reductions will be made, on the contrary I believe a full development of the facts will demonstrate that this is not only unnecessary but is in fact impracticable if that other great interest of the public is to be safe-

guarded, namely, the maintenance of a sound and adequate transportation system.

It might be that when the commissioners get the facts before them the picture will be such that they can very properly say to Congress, "We have made a thorough study and review, just as you have indicated in your resolution, and we do not find that any reduction in rates or material changes in the rate structure can be made." If, however, through this study facts are developed that indicate changes are justified, I have every confidence that the situation will be met in a sound and businesslike way by the Commission.

I am impressed with, and want to impress upon you, the importance of this study. The inquiry is perhaps broader than anything we have ever had before with respect to rates. There is opportunity here to aid the commission and in so doing to protect the railroad situation, and I feel that much of the responsibility, and I know a great deal of the work of developing the essential facts, is going to fall on the shoulders of you gentlemen.

Tell the Public Where the Money Goes

I have wondered at times whether from the published statements of the carriers as to their earnings and expenses the public secures a clear conception of just how the money they pay for transportation is expended. While the expressions covering expenditures for maintenance of way, maintenance of equipment, transportation, etc., are understandable to those engaged in the phasized and more definitely set forth both by accounts and in the aggregate. I thought to present a memorandum which would portray what I have in mind in this particular, but because this information is not furnished in detail for roads of all classes it was found impracticable readily to set up a statement by accounts and distributed as between labor, fuel, material and miscellaneous. Without any desire to introduce the Baltimore & Ohio into the discussion, I am taking the liberty of submitting a statement which carries out in part the suggestions I have hoped might have your consideration. What I believe to be one of the most helpful exhibits we were able to submit in the rate hearing of 1920 was a statement compiled in this form for the Class I carriers in the Eastern district.

Nevertheless, at no time within my recollection has there been evidenced such interest and mutual consideration between the railroads and the public as exists today, and with the accomplishments I have outlined, it seems reasonable to expect that the railroads will continue to justify the confidence thus developed, and in that event it is not too much to hope that the public will continue their confidence in, and appreciation of, the efforts of the carriers to give efficient transportation at the lowest possible cost.

We all live for profit in one form or another. Some receive it in terms of money; others, like Burroughs, Edison and the late Luther Burbank, found their profit in the solution of problems in which they were so deeply interested. Someone has likened life to a bookkeep-

THE BALTIMORE AND OHIO RAILROAD COMPANY STATEMENT OF OPERATIONS

For the Year ended December 31, 1925

RAILWAY OPERATING REVENUES OR WHAT THE COMPANY COLLECTED AND RETAINED:					
From transportation of 104,637,773 tons of freight resulting in 19,459,442,692 ton miles at an average rate of 9.95 mills per ton-mile				$193,558,361	
From transportation of 14,745,684 passengers resulting in 878,441,702 passenger miles at an average rate of 3.177 cents per mile				27,904,665	
From transportation of the many millions of pieces of United States Mail handled under contract				2,719,186	
From transportation of express covered by contract with American Railway Express Company				5,225,380	
From all other sources such as charges for switching, transportation of milk, excess baggage, caring for parcels, dining car service, etc.				8,139,348	
Total railway operating revenues				$237,546,940	
RAILWAY OPERATING EXPENSES OR WHAT THE COMPANY PAYS FOR PRODUCING TRANSPORTATION:	*Labor*	*Fuel*	*Material and Miscellaneous*		*Ratio %*
For maintenance of way and structures	$13,508,771	$111,853	$14,819,792	$28,440,416	11.97
For maintenance of equipment	27,662,992	506,400	25,037,269	53,206,661	22.40
For supervising and soliciting traffic	2,705,801	375	1,844,906	4,551,082	1.92
For transportation of traffic	57,464,833	12,501,871	14,655,173	84,621,877	35.62
For general supervision and expenses	4,665,193	.....	1,545,195	6,210,388	2.62
For operating dining cars, grain elevators, etc.	826,599	12,619	1,229,955	2,069,173	.87
Total railway operating expenses	$106,834,189	$13,133,118	$59,132,290	$179,099,597	75.40
Per cent of total operating expenses	59.65%	7.33%	33.02%		
NET REVENUE FROM RAILWAY OPERATIONS				$58,447,343	
CHARGES TO NET REVENUES FROM RAILWAY OPERATIONS:					
For United States Government income tax, state and Municipal taxes				$10,064,868	
For revenues representing freight charges which cannot be collected due to bankruptcy, etc.				53,451	
For rent paid other companies for use of equipment in excess of that collected for use of Baltimore and Ohio equipment				4,368,704	
For net rent of other railroad companies' facilities used jointly				926,233	
Total charges to net revenues				$15,413,256	
NET RAILWAY OPERATING INCOME AS DEFINED IN TRANSPORTATION ACT OF 1920				$43,034,087	

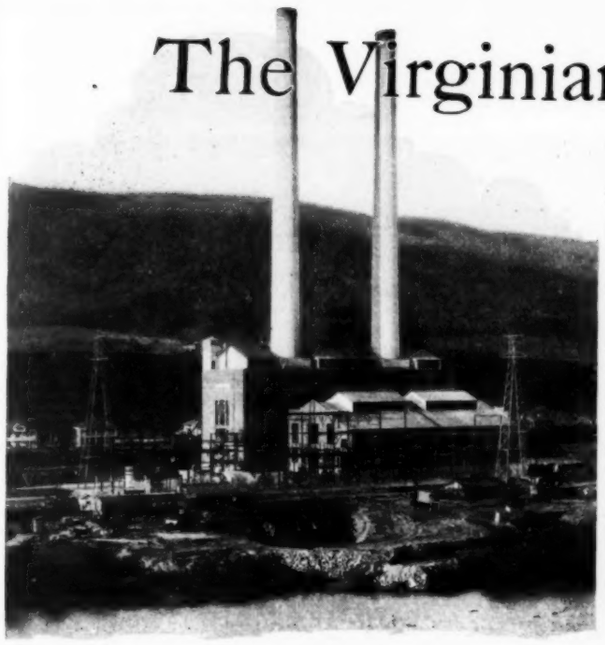
service, as well as economic students whose business causes them to take an interest in the question, I believe the public in general would understand and appreciate a statement, which, instead of segregating the expenditures by accounts, did so through the medium of expenditures for the major items, such as labor, materials and supplies, fuel, casualties, depreciation and retirements, taxes, rents, and other expenses.

While I appreciate the difficulties involved in this suggestion, I have hoped that in your further consideration of the revision of accounting practices it might be arranged so that these factors should be eming account, wherein the final net appears after deducting all unhappiness. Having had the opportunity of meeting with you, I am convinced this body is fully qualified in that character of bookkeeping. I trust you will continue to work on the problem of "deducting unhappiness" from life, and that you will realize the final net "happiness" in full measure.

THE ST. LOUIS-SAN FRANCISCO operated 5,008 of its 5,167 passenger trains on time during the month of July, making an on-time percentage record of 96.9 per cent, as compared with 95.3 per cent for the same month in 1925.

The Virginian Power Plant

Station is designed to burn powdered "bone" coal and to accommodate large variable load



The Plant Is Located on the New River at Narrows, Va.

THE electric haulage of coal trains, recently inaugurated by the Virginian Railway Company, constitutes, in respect to size of train unit operated over adverse grades, the heaviest concentration of power on a moving train ever undertaken. The electrification when completed this fall will extend from Mullens, W. Va., to Roanoke, Va., a distance of 134 miles, and will include the heavy grade portion of the railway where it crosses the Appalachian mountains.

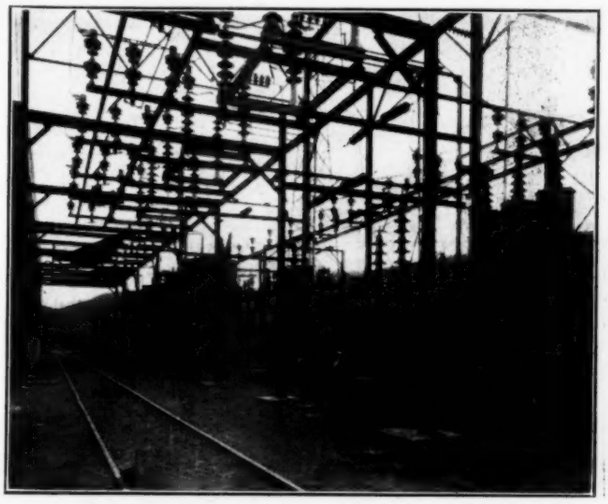
The maximum yearly tonnage for which apparatus is

The Turbine Room

installed is 12,500,000 tons of coal, or 17,500,000 gross tons (cars and lading eastbound, with a small additional amount of manifest tonnage). The system is laid out to take care of a maximum day's traffic of 60 per cent above the average day.

A steam power plant has been built for this operation on the New River at Narrows, Va. The selection of the site was determined by considerations of an adequate supply of condensing water, nearness to center of gravity of load, suitability of the location from the physical standpoint, and convenience for housing the operating forces in an established community.

The plant contains four 3-phase, 11,000-volt, 25-cycle, turbo-generator units, having a continuous rating of 10,000 kw. at 80 per cent power factor, with five 1,521 hp. cross drum boilers, equipped to burn pulverized fuel.



The Step-Up Station Outside the Plant

The power house is designed as to permit of extension ultimately to include seven turbo-generator units and nine boilers. The generator voltage is stepped up through four 10,000 kv.-a. transformers to 88,000 volts for single phase transmission.

Power Plant Building

The power plant building is constructed of brick and concrete with structural steel columns and floor beams, and with a roof of special heat-insulating concrete slabs covered with zinc shingles. The boiler room is 217 ft. long, 62 ft. wide and 91 ft. high, giving room for six boilers, five of which are installed. The boiler ash pits, pulverizing mills and feedwater heaters, are located at ground level. A mezzanine gallery, 23 ft. above the lower floor, provides space for the pulverizer exhausters, the feeder blower fans and future coal drying units. The main operating floor is located 36 ft. above the lower floor. A mezzanine gallery is located at the rear of the boilers, 12 ft. above the main operating floor and provides access to the rear of the boilers for the removal and replacement of tubes. The ground area occupied by the boiler house building is 13,500 sq. ft., or 1.48 sq. ft. per boiler horse power, and 0.34 sq. ft. per kw. of generator rating. The boiler house contains 32,800 sq. ft. floor area, or 3.6 sq. ft. per boiler horse power,

and 0.82 sq. ft. per kw.—all allowances including space required for the pulverizing units as well as that required by the boilers. The floor area of the turbine room is 11,500 sq. ft. thus providing 0.29 sq. ft. per kw.

The electrical bay has two floors above the ground level and provides space for the high tension bus and switch gallery, the switchboard control gallery, a machine shop, tool room, storage battery room, toilets, and administrative offices.

A basement under the turbine room and electrical bay, 32 ft. below the ground floor, provides space for condensers, circulating pumps, condensate pumps, boiler feed pumps, house service pumps, filtration plant, and storage space for plant supplies.

A mezzanine gallery 18 ft. below the ground floor provides space for possible future reactance coils for the main turbo-generators and for a 440-volt switch gallery.

There are two stacks, of reinforced concrete, which are carried on and directly bonded into concrete mats at the roof of the boiler room. These stacks are 25 ft. 8 in. outside diameter at the bottom and 16 ft. inside diameter at the top, and rise 285 ft. above the concrete footings, making a total height of 376 ft. above the bottom of the ash pit.

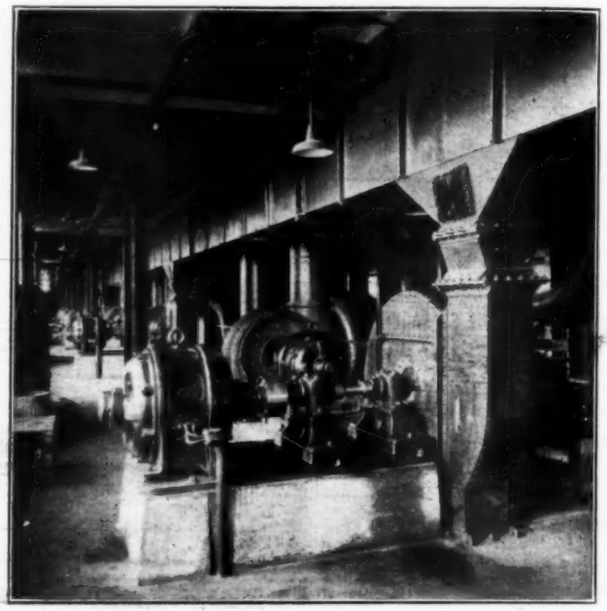
Boiler Room Equipment

The plant has been designed for the use of "bone" coal, with provision for burning the high grade bituminous coal from the mines served by the Virginian Railway Company, or a mixture of the two.

It is expected that the total annual net output of the plant will be approximately 120,000,000 kw.-hr., and that the average daily fuel consumption will be approximately 390 tons of "bone" coal, or 275 tons high grade bituminous, or 320 tons of a 50 per cent mixture.

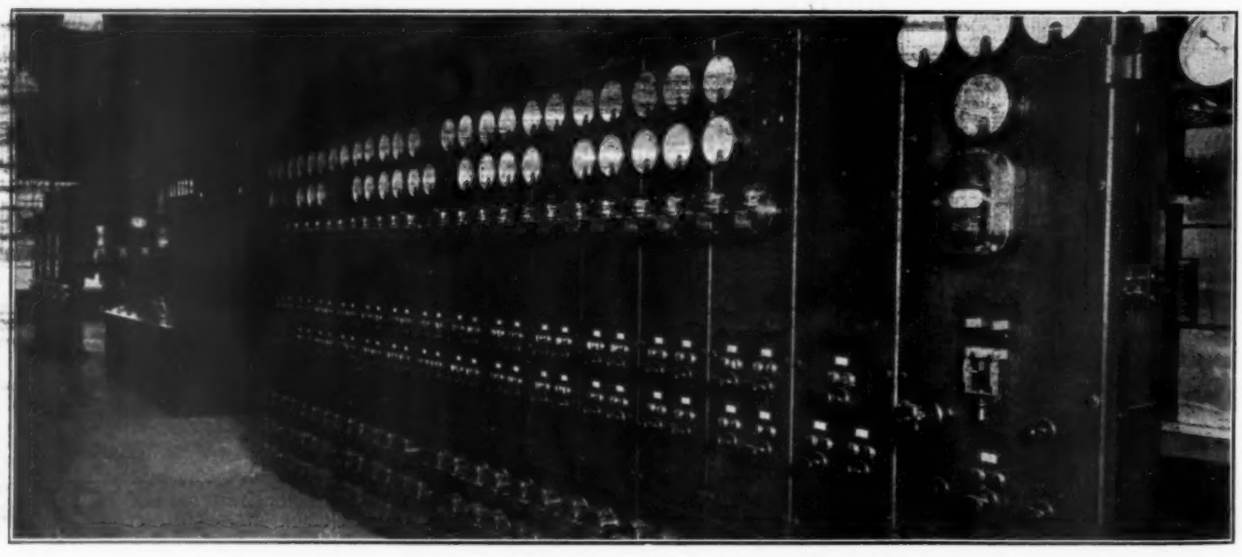
Boilers are of the cross drum horizontal water tube type, built for 325-lb. pressure. They are arranged in a single row, with independent settings extending from the lower boiler room floor upward 62 ft. to the top of the boilers. The boilers, superheaters, and pulverized fuel firing facilities are located from 40 to 62 ft. above the lower boiler room floor. An operating gallery has been provided, located 36 ft. above this lower floor and so arranged that the operating forces have complete control of the boiler operation from one level.

Water screens are provided, designed to prevent formation of slag, and to allow operation with high CO_2 content of furnace gases. The refuse resulting from the combustion of pulverized fuel is by reason of the cooling action of the water screens, a finely divided granular ash. This is carried away from the boiler by a sluiceway into the river.



Blowers for Supplying Air to Pulverized Fuel Burners

In addition to the usual safety valves, water columns, blow-off valves, gages, etc., each boiler is equipped with a feedwater regulator designed to retard the flow of water into the boiler on sudden increase of load until conditions are equalized, after which the feedwater is fed at the rate of steam flow. These regulators have an indicating device so that the operator of the boiler



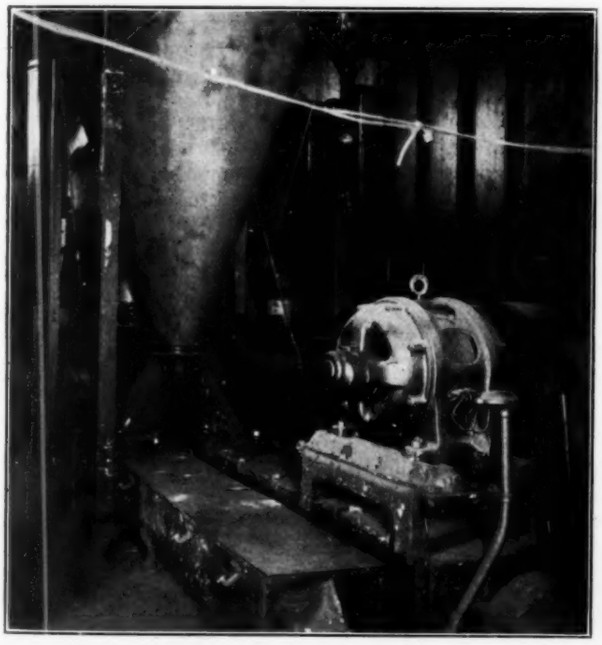
The Generator Regulator Switchboard, the Bench Board and the Auxiliary Power Switchboard

room floor may determine if the regulator valve is functioning properly.

A control has been installed for regulating the supply of fuel and air for varying loads, consisting of a master switch actuated by steam pressure in the saturated boiler header, fitted with a recording gage to register the variations in boiler header pressure, and with a motor-driven electrical contactor so arranged as to send electrical impulses to the control equipment, and designed to increase the flow of air and coal on a dropping pressure and to decrease it on a rising pressure.

Turbo-Generators

Four main power units have been installed, each of 10,000-kw. capacity, 25 cycles, 3-phase, 11,000 volts, having direct connected exciters. One 300-kw. auxiliary turbo-generator is provided. The turbines are connected through a pin type flexible coupling to the generators, each of which is designed for a continuous full load rating of 12,500 kv.-a. at 80 per cent power factor. A



Screw Conveyors and Motor Drive of the Pulverized Fuel System

125-kw., 250-volt direct connected exciter is mounted at the end of each generator.

The 300-kw. turbine is of the impulse type and is direct connected through a reducing gear to a 3-phase, 440-volt, a.-c. generator; a 100-kw., 250-volt d.c. generator; and a small d.c. generator supplying excitation to the a.-c. machine. The 440-volt, a.-c. generator supplies power for the operation of the auxiliary equipment during the starting up of the power plant, and is available for special service during regular operation. The 100-kw., d.-c. generator is provided to supply excitation to any one of the main units in the event of failure of the direct connected exciters furnished with them.

Each turbine has a surface condenser, with circulating water pump, a two stage air ejector, and a condensate pump.

The boiler feedwater system consists of bleeder heaters at each of the turbines, two open water heaters, three turbine driven boiler feed pumps and a loop system of boiler feed piping between the pumps and the boilers.

Switching and Electrical Connections

One phase of each generator is connected to the primary of a 10,000 kv.-a., single phase, 9,800/88,000-volt, step-up, water-cooled transformer. The connections are arranged for normally operating each generator and corresponding step-up transformer as a unit. Each step-up transformer is connected on the secondary side, through an oil circuit breaker to the 88-kv. bus, which is divided into two sections by a switch, with two step-up transformers connected to each section.

The arrangement of bus sections is such that with any 11-kv. bus section and the corresponding 88-kv. bus section out of service, it is still possible to keep in operation two generators, two step-up transformers, two auxiliary transformers, one step-down transformer of the Narrows step-down substation, the water rheostat installation and one transmission line.

The electrical operating gallery contains the generator and exciter field rheostats, exciter, field and regulator board, main control instrument and relay board, auxiliary power control instrument and relay board, battery, charging and control power panels, lighting panels, graphic watt-meter panel, and temperature indicating and transformer alarm panel. A small balcony projecting into the turbine room allows a view of the turbine room and provides space for the power director's desk in front of the control bench board.

The control power for circuit breakers is 220-volt, obtained from a storage battery which is charged by two motor generator sets, one of which is kept floating on the buses at all times, keeping the battery fully charged.

Transformers

Three auxiliary transformers are connected to the 11,000-volt bus through three oil circuit breakers, and are each 1,200 kv.-a. 11,000/440-volt three-phase. The entire load can be carried by two transformers, leaving the third in reserve. A further source of auxiliary power is the 300-kw., 440-volt, three-phase, turbine-driven generator previously described.

The outdoor transformer and switching station includes auxiliary and lighting transformers, main step-up transformers, and the 88-kv. transmission line lightning arresters. It also includes the step-down transformers for feeding the trolley at Narrows.

Regeneration

The electric locomotives used are of the split-phase type in which the 12,000-volt single-phase power from the trolley is stepped down through a transformer on the locomotive and converted to three-phase for the traction motors by means of a synchronous phase converter. This type locomotive provides automatic change from motoring to regeneration as the grade charges, without action of the engineman other than a movement of a lever operating the transformer balancing switch.

The regenerated power is returned to the substations and finally to the Narrows power plant where excess power is absorbed by a water rheostat consisting of electrodes immersed in the river.

The electrical apparatus was furnished by the Westinghouse Electric & Manufacturing Company as a part of their general contract for apparatus for electrification of the railway.

The power plant was designed and constructed by Gibbs & Hill, consulting engineers of New York City, as a part of their work as engineers of the electrification, under the general supervision of H. Fernstrom, chief engineer of the Virginian Railway and Hugh Pattison, engineer of electric traction.

L. A. Richardson Addresses Tool Foremen's Meeting

THE fourteenth annual convention of the American Railway Tool Foremen's Association was held at Chicago, September 1 to 3. The feature of the opening session was the address of L. A. Richardson, general superintendent motive power of the Chicago, Rock Island & Pacific, who spoke in part, as follows:

"The ever-increasing weight of locomotives and the increased number of special appliances used therewith, have made necessary a considerable increase in the size and capacity of machine tools. Increased production and increased accuracy are also essential.

"The general trend in railroad shops toward grinding and milling operations is going to require a more intensive analysis by our tool room men than ever before, for it is to them that we turn when the problem becomes one of extreme accuracy and close tolerances. However, the idea is sometimes erroneously entertained that the function of the tool room in a railroad shop is for the manufacture of tools; such is not the case, nor should it be. The general standard tools are manufactured by reputable concerns whose products give excellent performance. We cannot, and should not, try to compete with them when it comes to the manufacture of standard tools, such as taps, drills, reamers, cutters, etc.

"There are a sufficient number of special tools required at a railroad shop to take the full time of any tool room staff in their manufacture and service, and it is to this end that tool foremen should confine their efforts in their daily work. In other words, if maximum production is to be obtained, very close analysis must be made to determine the special jigs and fixtures most economical to use. This is the peculiar function of the tool room staff, for it is only by this effort that such equipment can be developed, and it has only been through such effort in the past that such equipment has been developed.

"Another important function of the tool room staff is that of repairing. This includes not only the heavy machinery in the shop but small tools such as pneumatic tools and other small equipment. It also includes the keeping of tools in first-class condition, seeing that they are properly ground, hardened and tempered.

"Another function of the tool room staff, many times overlooked, is that of inspection and follow up of tools. By this I mean that as all new tools put into service pass through the tool room, they should be carefully inspected for accuracy and compliance with standard. This means the use of gages with which every tool room should be supplied; but more important than this is the follow up of tools to determine the cause of breakage or excessive wear, and to run down the cases of mishandling and abuse, and see that such cases are corrected. It is in this capacity that the tool room foreman can save his company many thousands of dollars a year, for unfortunately there is perhaps a greater amount of money wasted in the mishandling and abuse of small tools than in any other single shop investment. The best method for this check can only be developed by individual analysis at each point."

One-Piece Engine Bed

A NEW one-piece engine bed, one of the largest and most intricate steel castings yet produced, will be applied to each of the five 4-8-2 type class Mt-4 locomotives now under construction in the Southern Pacific general shops at Sacramento, Calif. This engine bed is a new departure in the construction of locomotives and the Southern Pacific is one of the first railroads to use it. It is one solid steel casting, 52 ft. 2½ in. in length; maximum depth, 4 ft. 3½ in.; and maximum width 10 ft.

The weight of the engine bed, complete with pedestal binders, is 40,600 lb. The cast steel used in the engine bed contains about 0.0018 parts by weight of carbon, and 0.0073 parts by weight of manganese. It requires but 11 minutes to pour the steel into the mold for one complete bed. The steel is poured through a special nozzle from a ladle containing about 50 tons of molten steel. The engine bed is the result of an idea developed by the Commonwealth Steel Company, Granite City, Ill., after many years of study and research work. The five engine beds, the first purchased by the Southern Pacific, were designed by the Commonwealth company subject to approval of the railroad. Each one of these beds combines in one casting the usual two main frames, cross bracing, front and back deck castings, etc. By combining these pieces all in one casting, objectionable splices and bolts, together with considerable fitting and finishing that is necessary with ordinary locomotive frames, are eliminated.

The machining of the various parts of this enormous casting in the Commonwealth plant required such machines as large 10-ft. planers, with beds in excess of 30 ft. long; specially designed slotters, cross-cut planers built specially for certain difficult planing, and equipment for hydraulic washing of the casting after removal from the mold.

A One-piece Engine Bed, Considered to be One of the Largest and Most Intricate Steel Castings Produced, is Being Used in the Construction of Five 4-8-2 Locomotives in the General Shops of the Southern Pacific at Sacramento, Cal.

Growth and Present Status of Employee Representation*

PART II—*Extent to which it has been applied on the railroads—Some of the results*

THE pioneer days of employee representation witnessed no applications to the railroad industry in this country. In European countries, where the works council idea obtained early favor, the transport workers, which included the various classes of railroad employees, were among the first to put the representation principle into practice.

It was inevitable that employee representation should sooner or later become a part of the machinery of human relations on the railroads of this country with their many thousands of employees. As a means of bringing about adjustments between employer and employee, as well as an outstanding vehicle for constructive education, adjustments and better understanding, employee representation fitted into the objectives of the Transportation Act of 1920. Even so, there were no plans in general use by any number of the railroads until 1922. The cessation of shop operations in that year afforded an impetus for the development of employee representation and a majority of the 37 plans now operative (as shown by the tabulation) were installed.

The management of one road in putting forth the reason-for-being of its plan—one of the first—declared: "That men are fair and reasonable when they know the facts; that employees and management have an equally vital stake in the railroad and that their success as individuals and as two groups of individuals is determined by their joint success."

Some of the instances of adaptation of employee representation to railroading and its developments are cited herewith.

Santa Fe Shop Crafts Plan

In August, 1922, bylaws were drawn up for the various mechanical department crafts, of which an "Association of Blacksmith, Helpers and Apprentices" on the Atchison, Topeka & Santa Fe is typical. A resolution was offered June 12, 1923, by a chairman of one of the shop associations of that road for the extension of the plan to each division or local point where men were employed in sufficient numbers; as a result a comprehensive program of employee representation was worked out in the Santa Fe plan of co-operation for the shops of that road.

The constitution provides for the association type of representation. Employees are brought into the plan through membership in the association. Representation is afforded them through a system of shop councils. Because of the similarity of many subsequent plans to this form of employee representation as developed on the Santa Fe, the provisions for the shop council vehicle are reproduced herewith, illustrating the way in which certain fundamental representation principles are codified; the kinds of matters considered at meetings, etc.

"1—The meetings are known as shop councils.

"2—Shop councils are held once a month at each shop where men are employed in sufficient numbers to hold meetings.

"3—The shop councils are held on a fixed day of any week of each month; for example, the fourth Friday, or second Monday, and so forth, and begin at an hour mutually arranged by the chief supervising officer and the local chairman of the associations at that point.

"4—The chief supervising officer or his designated representative at each shop or point attends each meeting of the shop council. The supervising officer makes all necessary arrangements to the end that a maximum number of his subordinate officers are in attendance at each meeting.

"5—All members of the local committee employed on off-day shifts, as well as any system general chairman or grand division chairmen who are at that point at the time are expected to attend shop council meetings.

"6—All local committeemen who are employed on the shift during which the shop council is held attend each meeting unless one or more of the committeemen are at that time employed on work which they cannot leave, and no deduction is made for time of such committeemen account of attending shop council.

"7—Officers other than those included in above paragraphs 5 and 6, are invited to attend meetings of the shop council.

"8—At each meeting of the shop council held the chairman for the next meeting is selected, the chairmanship alternating from meeting to meeting between one of the officers or subordinate officers of the company and one of the committeemen.

"9—Minutes are kept of the proceedings at each meeting, and after they are written up are signed by the chairman and secretary, the minutes showing—(A) Place and date Shop Council is held. (B) Names of those attending. (Officers and official title; committeemen and craft or class of each; and others, indicating occupation of each.) (C) Subjects discussed and action taken.

"10—The order of business at each meeting is as follows: (1)—Reading of minutes of preceding meeting held, showing action taken thereon. (2)—Suggestions that may lead to safer practices or more comfortable or more healthy surroundings. (3)—Suggestions that may lead to greater economies in operation or to increased efficiency. (4)—Handling grievances or discussing any differences of opinion arising under the application of the agreement between the management and the shop craft association, and disposing of same whenever possible by mutual agreement to do so. (5)—Shop problems of local management. (6)—Other new business. (7)—Unfinished business. (8)—Discussion of questions or matters in which members of the shopcraft associations and management are mutually interested. This includes—(A) Safety measures. (B) Constructive measures that may lend a tendency to make the daily work more pleasant. (C) Constructive measures that may lend a tendency to encourage a greater degree of confidence between the employees and their supervising officers. (D) Output. (E) Efficiency. (F) Loyalty. (G) Conservation of time and material. (H) Relations between the management and the association.

The foregoing excerpt illustrates some of the provisions written into a typical, successful railroad representation plan.

Spirit and Purpose of Employee Representation

The spirit and purpose actuating another typical plan, in force successfully on a leading eastern carrier, are

*Part 1 of this article appeared in the *Railway Age* of August 28, 1926, page 365.

exemplified in the following extracts from the preamble to the constitution:

"We believe that with unity, guided by intelligence and with an intelligent association, we can acquire discipline necessary to enable us to act together, toward a common purpose. Therefore, for the purpose of promoting such a unity of action and the general welfare of our members, this association is established to provide:

"(a) A definite and durable basis of mutual understanding and confidence.

"(b) An association through which the employees and management may directly and between themselves settle differences of opinion.

"(c) An association through which the employees may by mutual contact, discussion and investigation, advance themselves in the knowledge of their craft and better themselves for promotion.

"(d) An association which will recommend to management, after deliberation and investigation, methods and plans to conserve constructive relations and to promote the efficiency and economy of the service.

"(e) An association whereby rates of pay and working conditions may be determined between the company and the mechanics, helpers, apprentices, and such other crafts or classes of employees as may by majority vote elect to have this association represent them, employed by and under the jurisdiction of the mechanical department, and further defined in Article Two (dealing with membership and jurisdiction) of this Constitution.

"(f) To protect and promote by joint action the interests of the public."

Both Committee and Association Types Used

Of the three major types of representation, namely committee, employee association and industrial democracy, the railroad adaptions have not utilized the last-named, and of the first two, the association or club method predominates. This may not be a reflection of inherent excellence, but may merely indicate a choice based on the needs of individual railroads' properties.

The committee type lends itself to the railroad organizational structure, with numerous shop units, many of which are scattered. The association or club type makes use of the committee structure of representation and includes an additional feature, namely, membership in a definite organization, which tends to give every employee a consciousness of his new relationship.

Proof of representation, like that of pudding, is in the eating. Both the users of the committee and of the association forms are gratified at the nourishment which either form, adequately and soundly installed and maintained, gives to their employee-management relations.

Among the present users of employee representation on railroads are the following:

Name of Road	Date of Plan's Inception	Type of Plan
Atlanta, Birmingham & Atlantic	1923	Committee
Atchison, Topeka & Santa Fe	1922	Association
Atlantic Coast Line	1922	Association
Baltimore & Ohio	1922	Committee
Central of Georgia	1922	Association
Chicago, Burlington & Quincy	1922	Association
Chicago, Rock Island & Pacific	1922	Association
Delaware & Hudson	1922	Association
Delaware, Lackawanna & Western	1922	Association
Denver & Rio Grande Western	1922	Association
El Paso & Southwestern	1922	Association
Fort Worth & Denver City	1922	Association
Great Northern	1922	Association
Gulf Coast Lines	1922	Association
Illinois Central	1922	Association
International Great Northern	1922	Association
Kansas City Southern	1922	Association
Lehigh Valley	1922	Association
Maine Central	1922	Association
Minneapolis, St. Paul & Sault Ste Marie	1923	Association
Missouri-Kansas-Texas Lines	1922	Association
Missouri Pacific	1922	Association
New York, Chicago & St. Louis	1922	Association
New York, New Haven & Hartford	1922	Association
Norfolk & Western	1922	Association
Northern Pacific	1922	Association
Northwestern Pacific	1922	Association
Pennsylvania System	1920	Committee
Richmond, Fredericksburg & Potomac	1922	Association
Rutland Railroad	1922	Committee
Southern Pacific	1922	Association
Spokane, Portland & Seattle	1922	Association
St. Louis-San Francisco	1922	Association
Texas & Pacific	1922	Association
Union Pacific System—(including Oregon-Washing R. R. & Navigation Co.; Oregon Short Line; Los Angeles & Salt Lake)	1922	Association
Wabash Railway	1922	Association
Total railroad representation plans		36
Plans in operation prior to 1922		1
Plans adopted in 1922		33
Plans adopted subsequent to 1922		2
Committee type of plan		4 or 10.6%
Association type of plan		32 or 86.5%

Some Results

In analyzing the attitude toward employee representation of those managements which have had experience, it is significant to find it rarely if ever characterized as a panacea that automatically will work wonders. In giving expression to the principles of a railroad employee representation plan, a leading railroad officer voices this attitude:

"We do not claim that we have found the only solution of the problem. We do know that we have found faith in each other as times goes on. We have as a result settled amicably, to the mutual satisfaction of both officers and employees, such fundamentally important questions as wages, schedules of working conditions, piece-work prices, questions of discipline and discharge, all of which in the old days proved vexatious and troublesome and for which there had been no systematic method of solution."

This viewpoint prevails among executives who have had experience with employee representation, and the same disposition is characteristic of employees, who likewise do not regard it as a patent medicine, good for everything that ails you, but rather as a step in the direction toward sounder relationships, with encouraging results thus far.

The Pennsylvania plan was already in operation when the shopmen's strike was called in 1922. Less than 30 per cent of the shopmen on the Pennsylvania System walked out. Within two months the shop forces of the system were 95 per cent of normal.

Disposition of Controversial Questions

A study of the disposition of grievances and controversial questions between management and men by a representation plan on a large road affords evidence of the results of this railroad adaptation of employee representation principles. The same sort of experiences have accrued to other roads on which representation is operative. Analysis of records of a typical six months' period shows a total of 5,201 cases taken up with individual officers from below the grade of superintendent on up through the general managers. A little more than 49 per cent of these cases were adjusted or compromised in favor of the employees, in conference between the employee representatives and the respective officers, without appeal and therefore without the necessity of review before a higher committee. Appeals from the decisions reached by conference of officers and employee representatives were taken in 1,239 cases, or about 24 per cent of those handled. In 1,409 cases, or about 27 per cent of the total, the matter was withdrawn as having no merit, or for other causes. It was necessary to appeal to the reviewing committee in *less than two per cent* of the cases, of which 49 were decided in favor of management, 20 in favor of employees and 29 were withdrawn.

These matters affected engineers, firemen, conductors, trainmen, shop craft employees, signal department, maintenance-of-way, clerical employees, telegraphers, marine employees and miscellaneous forces and included ques-

tions as to seniority, discipline, time allowance and other matters.

Prompt Action

The small percentage of cases for review by the "top" committee is characteristic of the statistics of employee representation, and it is a forceful commentary on the effectiveness of the representation machinery that it thus actually does reach decisions mutually, and is not merely a safety valve for talk and opinions, and that a majority of such decisions are arrived at without having to go on and up from committee to committee. Such review consumes a vast amount of time. In human relations, time is of such importance that any procedure which does not insure prompt action is of doubtful result-value. Certainly it is seriously handicapped. Often the longer the time interval, the less satisfactory the settlement.

The benefit accruing to the railroad industry through this expeditious handling of cases in dispute is undoubtedly an important element in the substantial present success of employee representation on the railroads. Such a benefit operates in two ways: It registers an immediate impression and thus quickens co-operative dispositions; and it imposes less overhead expense in time and energy for the settlement of differences. Instance of how vital is the time element is afforded by the experience of the Railroad Labor Board. When the Transportation Act of 1920 was passed, it was contemplated that the issues for the most part would be settled by direct negotiation between the unions and the roads, and that the board would concern itself mostly with national issues. Because of an unwillingness of the parties concerned to make such settlement, the docket of the Labor Board became overcrowded and the resultant delay materially increased friction. Since 1922 a revival of direct negotiations and a prevalent disposition to come to satisfactory settlement, without passing matters unduly to the board, materially decreased the number of cases for its decision, a condition which suggests not only an increase in sympathetic attitude and disposition toward each other's problems on the part of employees and management, but collaterally, the value of representation plans on the railroads.

Shop Council Suggestions

The same sort of evidence is afforded by the accompanying analysis for the year ending December 31, 1925, covering shop council meetings by grand divisions on the Santa Fe. As will be seen 82.1 per cent of the suggestions proposed at council meetings were adopted, with a considerable number given further consideration. The constructive effect of such adoption on employees is undoubtedly great.

Suggestion Plans

An interesting item is the fostering of employee suggestion plans. The effective, co-operative administration of such plans aims to develop a greater degree of interest on the part of employees in their jobs and in the business through specific suggestions. During the first 11 weeks of a suggestion box plan in the Sedalia shops of the Missouri Pacific, employing 1500 men, a total of 195 suggestions were received, of which 90 suggestions were adopted and completed; 72 suggestions were adopted but not completed, and 11 suggestions were held in abeyance. The annual gross saving from these suggestions was estimated by engineers at $60,916.72 and the cost to effect suggested changes $15,000, so that the estimated net savings as a result of the suggestions reached the sum of over $45,000. But of far greater importance was the constructive development of employees evidenced thereby. In this instance a special committee representing both employees and management administers the plan; acknowledges all suggestions by personal letter to the originator and explains the reason for non-adoption of suggestions which are not deemed feasible.

ANALYSIS OF SANTA FE SHOP COUNCIL MEETINGS BY GRAND DIVISIONS FOR THE YEAR ENDING DECEMBER 31, 1925

	Eastern Lines	Western Lines	Coast Lines	Gulf Lines	Topeka Shops	System
1. Number of shop council meetings held	117	228	203	72	11	631
2. Average attendance at these meetings	53	33	47	25	53	40.6
3. Average length of meeting in hours	1'42"	1'18"	1'27"	1'11"	1'13"	1'24"
4. Total number of suggestions submitted for discussion	1466	942	950	313	83	3754
5. Number of suggestions adopted	1176	768	775	296	68	3083
6. Percentage of those adopted to total proposed	80.2	81.5	81.6	95.0	81.9	82.1
7. Number of suggestions still under consideration but not disposed of	119	104	47	4	5	299
8. Number postponed because expense necessary to take care of them not justified at present time	34	4	5	6	0	49
9. Number dropped or closed because after full discussion considered impractical	137	66	103	7	10	323

The following two letters indicate the manner in which this latter vitally important contact with the employee is maintained.

This letter acknowledges a suggestion which was adopted:

"With further reference to your suggestion that all engine reservoirs now located west of old scrap dock be moved to material yard at gantry crane, you are advised that the supply department advised us that this will be put into effect at once.

"We thank you for the interest you are displaying in the suggestion plan, and look forward to receiving further suggestions from you."

The following letter explains the non-adoption of a suggestion, which explanation is vitally important if employee-interest is to be maintained and goodwill advantaged by the suggestion system:

"With further reference to your suggestion that fastenings be installed in floor at the end of each pit to which a block and fall may be hooked, you are advised that the executive committee thinks there would be too much liability of injury if this suggestion was adopted. In addition to this, the work which the crane now necessarily has to do makes it impossible for it to handle this additional work.

"In making any decisions on suggestions one of the most important phases to consider is the safety of employees, and even where a large saving could undoubtedly be shown in many cases by adopting a suggestion but jeopardizing the safety of employees we cannot make it effective.

"However we thank you for the suggestion, and look forward to receiving further suggestions from you."

Results on D. L. & W.

Another illustration of the results secured where the representation principle has been made fully operative is afforded in the statements of Edwin F. Daley, formerly assistant to the superintendent of motive power and equipment and director of personnel of the Delaware, Lackawanna & Western, on which property an employee representation plan is an important part of the personnel activities. The Lackawanna plan is of the

association type, covering mechanical and equipment employees.

"You may ask," said Mr. Daley, in an address before the New York Railroad Club, "what are the results of these applied theories—of these homely, everyday activities?

"First—In the last 18 months' period the yearly labor turnover has been reduced from 110.4 per cent to 36 per cent.

"Second—Absenteeism has been reduced during this same period 80 per cent, which represents a net monthly saving to the employees' pay envelopes of $47,000, aside from the saving in production to the management.

"Third—The personal injuries have been reduced 40 per cent, and 90 per cent of the present personal injuries can be classed as of very minor nature.

"Fourth—Production has increased 102 per cent over an 18-month period, with a decrease in man-load of 24.5 per cent, and with very little expended for actually placed new shop equipment. This can be attributed directly to the manner in which mechanical officials have utilized the co-operative spirit manifested by the various workers.

"Fifth—The employees' association has developed natural born leaders of men who have automatically stepped up to supervisory ranks—233 in the last 19 months.

"Sixth—The morale has spread out into the communities at large with the natural resultant sympathetic and co-operative spirit being manifested by them.

"Seventh—A gigantic mental reservoir has been tapped, flowing along constructive lines.

"Eighth—Stabilization has been produced, eliminating, except in super-abnormal conditions, those odious economic peaks and valleys.

"Ninth—A contented body of employees has resulted, living according to American standards and assuming their obligations as American citizens in their respective communities.

"Tenth—The policy of piece-work has been accepted enthusiastically by the workers as a class, they fully understanding and realizing that piece-work, in addition to offering remuneration, affords the management a scientifically correct measuring stick of their abilities.

A Striking Evidence of Interest

The association of shop employees of the Missouri, Kansas & Texas, offers another piece of evidence that the railroad employee grows more co-operative through the influences of contact, confidence, conference and co-operation, in the following letter sent by the System Board of the Mechanical Department Employees' Association to all local secretaries of the association:

"Gentlemen—The year just passed was a very successful one for the railroad from the standpoint of increased business. We are now entering upon the dull season of the year and it is the earnest desire of the management that each and every employee endeavor to get some additional business for the road.

"We are willing to co-operate, and are offering the following cash prizes for six months and will cover two three-month periods, prizes to be awarded at the end of each three months.

"For Individuals	
"1st	$25.00
"2nd	20.00
"3rd	15.00
"Total	$60.00

"A total for the time covered of $120.00 individual prize money.

"For Locals	
1st	$50.00
2nd	40.00
3rd	30.00
Total	$120.00

"A total for the time covered of $240.00 prize money to be paid to the locals."

Employees, in brief, were willing to contribute part of their money, for the treasury of the Association is employee property and not management property, to promote the welfare of their road.

Conclusion

The evidences cited herein of constructive results growing from employee representation are obviously not inclusive, but are nevertheless clearly indicative. The total evidence would assume such bulk that a book, rather than a brief article, would be necessary for its treatment.

The continuous joint conference method between the employees and management is not exclusively for adjustment of differences and grievances. Those issues are the elementary matters with which representation aims to deal. After all differences are settled, there still is a great deal that representation does and can do. Broadly speaking, it brings the employee and the executive together for planning and rendering more efficient the productive process.

Mutual consideration on another carrier developed these problems, among others, for joint consideration: Inadequacy of condition and availability of tools, materials, handling facilities, etc. Inadequacy of sanitary, heating, ventilating, lighting, washing, drinking and safety facilities. Lack of co-ordination of shop operations. Inadequate work control. Material supply delays.

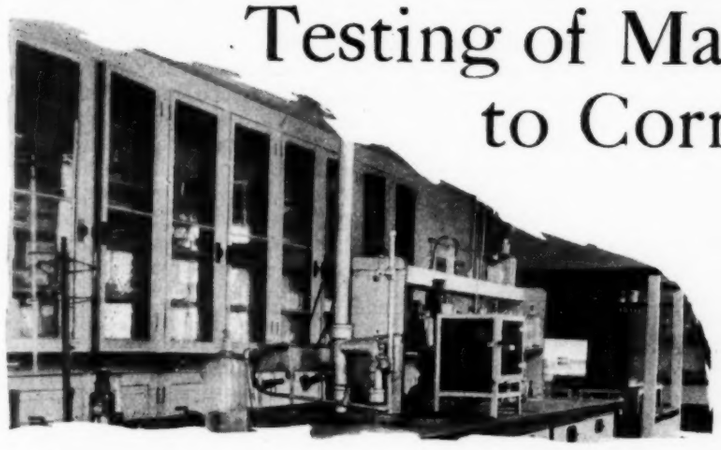
The employee is a vital factor in correcting such conditions, which cannot be permanently remedied unless he is an interested and co-operative party. One of representation's biggest objectives is the bringing of the employee into active participation and council on all matters of scheduling, routing, controlling, etc. These matters concern him, and as the man who does the job in its final stages, his suggestions are often of great value.

The future developments of representation will undoubtedly be along this general line of bringing the employee more completely into the productive process, mentally as well as physically; the principles of representation functioning not merely as a liquidator of grievances but as a continuous alignment of employees *with* management instead of *against*, for the efficiency and stability of industry.

NORMAN F. TITUS, of San Francisco, heretofore with the McCormick Steamship Company, has been appointed chief of the transportation division of the Department of Commerce, Washington, D. C. The transportation division is in the Bureau of Foreign & Domestic Commerce and Mr. Titus deals with transportation by land, water and air, primarily from a foreign trade standpoint.

Interior of One of Six New Dining Cars Built for the New Haven by the Pullman Car & Manufacturing Corp.

Testing of Materials Essential to Correct Purchasing



The best specification of little value without well organized and intelligent inspection

By N. F. Harriman*

THE purchase of materials and supplies which are used in the operation and maintenance of railroads is one of the most important items in their economical operation. In no other line are the demands upon materials and supplies more severe and exacting, and variations in the quality of materials for certain uses may explain the differences between success and failure. That a careful study and an intelligent understanding of the situation are necessary in the proper management of the purchasing department is evident from the extent to which engineering skill is being employed in connection with purchasing on many of the larger railroads, particularly in connection with supplies subject to variation in quality.

It is well known that almost all materials vary in quality and it is inevitable that some purchasers will receive better grades of materials than others. It is unfortunate, but true, that in some lines of supplies there are salesmen who are willing to foist inferior grades of goods upon unsuspecting purchasers, a regrettable fact which will be admitted by experienced purchasing officers. This condition has impelled railroad companies to prepare specifications for equipment, materials and supplies, which cover all materials and constructions subject to variation in quality or workmanship, and to insert clauses referring to strict compliance with specifications.

Testing Overlooked

It matters little who prepares the specifications, or how accurately and scientifically they are drawn, however, if the materials are not kept up to the standards set by careful testing. The importance of the scientific testing materials like the scientific conduct of their purchase, is one of the phases of the work which is apt to be overlooked, or at best, underestimated. The reason for this is largely due to the fact that the results are all negative. The careful day-to-day inspection and check of all incoming material acts as a scientific check upon the careless and the unscrupulous vendor. Because all small variations are caught and corrected there will be little opportunity to effect a large economy, but once permit the inspection department to relax its vigilance, and the waste from this source will at once begin to increase. Elaborate testing facilities, as well as an efficient corps of inspectors, are largely responsible for the high standard of much of the material and equipment secured by the railroad companies.

The testing of materials serves two important and distinct purposes; first, to ascertain whether or not they comply with specifications, and second, to add to the general fund of knowledge concerning them. Data accumulate rapidly in the regular work of the testing laboratory and when properly correlated it yields information of permanent value.

Eventually quality is found not to be a vague characteristic which can be judged only by experienced users, but rather as the utility aspect of a material in terms of a property or group of properties, each of which is measurable. The variation in these constitutent properties causes differences in quality. Personal opinions as to a quality or the effect of a given quality of service, may differ widely. Intelligent judgment, even, has no sure foundation until measured data are available. The personal factor is eliminated in direct ratio as a true measure of quality is developed. When this is complete, quality may be graded in terms of some ideal standard selected. The quality of coal, for example, may be specified and measured for a given use. The heat efficiency depends directly upon the combustible matter and is expressed in heat units per pound of fuel.

Put Quality on a Measurable Basis

Many qualities of materials are already placed more or less definitely upon such a measurable basis. The ultimate aim is to define all qualities in terms of units of measure. It is also known that there is usually a certain magnitude for each property which is the best for a given use and which may be ascertained by investigation or service experience. To obtain this magnitude of each property in practice is the object of technical specifications. To assure it is the function of tests.

The degree of accuracy to be sought becomes a very practical matter in a testing laboratory. The time and labor involved in such tests increase out of proportion as the limits of accuracy are approached. For the determination of physical constants or fundamental properties of materials the degree of accuracy sought may be the maximum possible. For example, a minute may suffice to determine the density of alcohol for commercial purposes by means of a hydrometer. Months, however, may be well spent in a precise determination of its density as a physical constant of technical importance. In general the degree of accuracy striven for should be that which is strictly good enough for the purpose in hand—whether the work be routine testing or scientific research. The selection of the degree of accuracy to be sought for in each case requires the experience and judgment of the specialist.

The question which naturally occurs first to the mind

* This is the third of a series of articles on purchasing, the first of which appeared in the issue of January 30, page 327, and the second in the issue of August 14, page 291.

of every executive is, what is the cost of inspection,—the second does it pay? At the present time the cost of inspection on delivery averages about one per cent of the money value of the material inspected. This includes all of the inspection division activities such as specification writing, considerable follow-up work on orders, all overhead charges, etc., in addition to strictly material inspection. The cost of inspection before shipment varies widely, depending upon the type of inspection, location, and other conditions. Such inspections seldom exceed two per cent of the money value of the materials inspected. But few railroads keep a detail record of the cost of inspection per unit.

An exact numerical answer to the second question is still more difficult. Where inspection can be organized upon an economic basis, its efficiency may be expressed by the ratio, $\frac{\text{money saved by inspection}}{\text{cost of inspection}}$. If this ratio is greater than 1.0, the system of inspection is a success. If the ratio is less than 1.0 inspection does not pay, and should be differently arranged or discontinued. The direct saving indicated by the writer's experience is 50 per cent above the cost of inspection so that on a plain, direct debit and credit basis, inspection under these conditions certainly pays. However, the direct saving is by far the least important of the savings resulting from inspection. The indirect savings are of much greater magnitude and of much greater importance.

Many Benefits

First, among indirect savings from inspection there is the moral effect of inspection upon the vendor. Experience has shown that vendors realize that it does not pay to supply material which falls short of specifications when inspection is made. When a few companies are inspecting and others are not, the vendor naturally will offer his best product to those companies which inspect. Ultimately, of course, the product will have to be made more uniform or of better average grade if inspection becomes sufficiently widespread. The knowledge of the fact that the material will be inspected and tested deters the shipment of inferior material and saves both purchaser and vendor the expense of adjustment and delay. This applies equally well to such materials as lumber, common and face brick, structural steel, reinforcing steel, bare and covered wire, high tension cable, etc.

There is also another indirect effect on the vendor which is of great significance. Adequate inspection frequently calls his attention to imperfections in his methods or materials which are unknown to him, leading to voluntary improvement on his part. For example, a manufacturer of fire brick of excellent refractory properties but varying too greatly in dimensions, after some argument corrected his molds and methods of drying and of burning with the result that he satisfied the requirements and gained considerable new business because of the unquestioned betterment of his whole line of wares.

The beneficial effects upon the railroad company's own organization are also quite important. Thus, the preparation of the complete specifications necessary for inspection makes many of the requisitioning departments determine more accurately the actual requirements which their materials must meet. Frequently, such specifications show plainly that competition is possible when a department previously considered is impracticable.

Furthermore, such specifications bring the purchaser and the vendor into closer understanding. The vendor inquires closely into the service expected of his wares by the purchaser. The purchaser benefits by learning manufacturers' limitations and often modifies his sepcification to admit of standard market wares rather than insisting upon special materials which in the end might not give appreciably better service.

Inspection also has been responsible for bringing specifications in alinement with those commonly used by the better manufacturers of a given material or piece of equipment. The savings possible from the purchase of standard stock as against specially fabricated material, when such action is possible, are well understood.

Importance of Quality Preserved

The inspection organization also has a very desirable effect upon the purchasing organization. It assists in preserving in that organization a full appreciation of the significance of quality as against the significance of price. It also serves admirably to assist the purchasing department in opening up new sources of supply and helps to keep the actual buyers informed with respect to the technical details of the products for which they are responsible.

Too much stress can not be laid upon the economic value of testing the quality of materials before their use. For example, the integrity of steel used for rails is of great importance in the railroad and steel industries, and a study of the effects of slight additions of other constituents or change in heat treatment or method of manufacture may be of great economic significance. On the other hand the failure of a rail due to brittleness may involve more than merely the cost of a new rail. Serious accidents with loss of life may be avoided if the properties which determine the reliability of the rail are known and if the rails are tested for such properties. The length of service of the rail could then be restricted by the limits of safety exactly as it is now restricted of necessity by the wear of the rail in service.

With the rapid increase in the height of buildings, lengths of spans for bridges, and speed of transportation, new problems in safety and efficiency arise. The measure of the quality of structural materials in advance of their use thus becomes a matter of supreme importance, for the safety of buildings, bridges, railroads, dams, car wheels, and similar constructions, must not depend upon merely estimated strength and durability. They must be guaranteed by specification and test. For example, the engineer adopts a stated strength of the structural materials called for in his design. The testing laboratory, however, can test these materials by sample in advance of their use, and by means of the strain gage can determine the net strain of the structure during its construction and after erection or assembling. The strength of the material may be ample in certain cases, but through fault of construction or design undue strain may be introduced which leaves but slight margin for the working load. Thus, the steel in a locomotive driving tire may be amply strong, but if the fit on the wheel center is so snug as to require excessive heating to accomplish its application internal strains may be developed which may cause failure in service. When suitable tests during and after construction are prescribed in building or inspection regulations and made part of the original specification in all cases, the responsibility for failure of structures rests with those who knowingly omit adequate tests where such are available.

Testing Paves Way for Better Specifications

It is recognized that testing is still incomplete with respect to the establishment of rigorous standards of quality, but it is to be emphasized that standards of quality can be developed only by research with the aim of correlating the properties of the material with specific

qualities. The measure of quality has not yet attained the higher position of simpler kinds of measure, because the testing of material has been so largely limited to separate properties or to experimental trial under simulated service conditions.

Specifications are too often not a real standard of quality at all. Too often they require tests which do not gage any desirable property and yet omit tests of vital importance. For example, a point specification may limit the ratio of hydrate of lead to carbonate of lead and yet omit any test of optical covering power—a property of utmost importance. The defect may be due to lack of knowledge or, too often, to an effort merely to duplicate material once found satisfactory. This is done by prescribing a special brand and adding the words "or equal," or by describing minutely the properties of the acceptable brand. Both methods are used in place of specifying the use required of the material—a practical recourse where a definite standard is still impracticable. However, the ideal specification is becoming a truer standard of quality. As this result is gained and methods of test are perfected, the testing of materials becomes a real test of fitness and specifications supplemented by these tests assure steady progress.

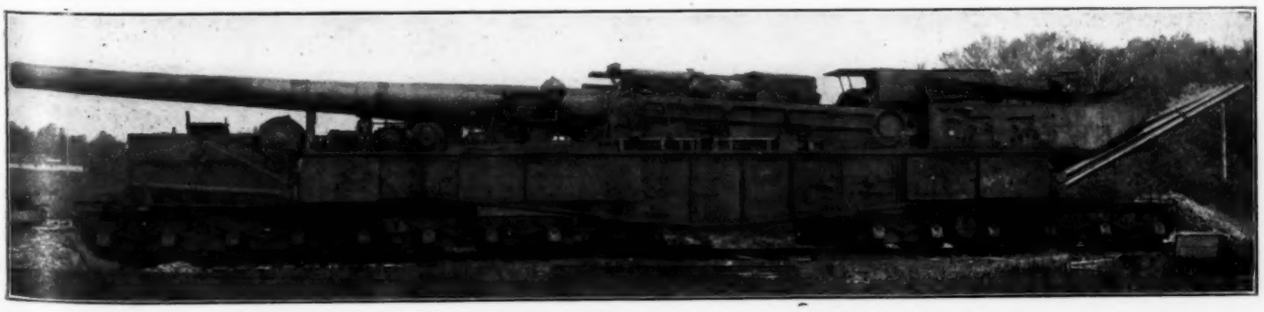
Railway Funded Debt Maturing

RAILWAY funded debt maturing in 1926 amounts to $166,875,739, of which $102,895,841 consists of equipment trust obligations, according to a compilation made by the Bureau of Railway Economics of future maturities of funded debt of Class I railroads, covering approximately 85 per cent of the total funded debt of all steam roads in the United States, from the annual reports of the carriers to the Interstate Commerce Commission. The Bureau's table follows:

RAILWAY FUNDED DEBT MATURING EACH YEAR—BASED ON FUNDED DEBT ACTUALLY OUTSTANDING ON DECEMBER 31, 1925

RAILWAYS OF CLASS I—UNITED STATES

Period of maturity Calendar year	Mortgage bonds	Collateral trust bonds	Income bonds	Miscellaneous obligations	Equipment trust obligations	Total funded debt
1926	$36,461,522	$26,765,814	.....	$752,562	$102,895,841	$166,875,739
1927	50,961,745	44,845,585	.....	27,592,637	95,047,445	218,447,412
1928	124,802,622	26,445,814	.....	584,562	93,180,044	245,013,042
1929	123,888,075	117,393,574	$18,892,062	63,533,595	92,901,597	416,608,903
1930	142,816,082	259,430,687	4,543,907	16,246,395	91,157,641	514,194,712
1931	181,048,042	40,531,868	6,000	618,620	88,762,968	310,967,498
1932	122,089,915	11,303,196	.....	1,055,295	86,647,546	221,095,952
1933	121,495,307	16,292,980	.....	71,179,620	82,469,146	291,437,053
1934	296,615,772	17,273,980	9,104,000	4,838,853	79,813,672	407,646,277
1935	86,074,672	14,947,980	5,564,900	27,971,350	77,284,671	211,843,573
1936	201,929,413	87,897,700	.....	5,467,620	48,856,825	344,151,558
1937	99,971,812	11,842,000	.....	13,190,721	45,476,452	170,480,985
1938	117,153,695	8,355,000	1,357,500	1,619,109	36,005,450	164,490,754
1939	151,869,339	13,181,900	210,526	4,933,451	18,821,451	189,016,667
1940	134,395,340	21,928,900	.....	5,048,647	6,258,476	167,631,363
1941	93,026,600	7,232,000	.....	8,542,562	125,000	108,926,162
1942	64,293,000	3,600,000	.....	44,562	.....	67,937,562
1943	95,388,650	.....	5,520,000	465,053	.....	101,373,703
1944	39,010,000	7,543,000	.....	29,444,562	.....	75,997,562
1945	108,811,710	.....	274,850	44,562	.....	109,131,122
1946	98,957,800	15,739,500	315,000	44,562	.....	115,056,862
1947	157,665,000	.....	.....	10,035,562	.....	167,700,562
1948	239,460,200	7,478,250	.....	38,585,762	.....	285,524,212
1949	260,749,100	40,096,400	31,035,670	44,562	.....	331,925,732
1950 to 1959	1,391,530,706	196,132,700	63,032,843	84,535,241	.....	1,735,231,490
1960 to 1969	850,530,045	50,000,000	91,069,000	526,000	.....	992,125,045
1970 to 1979	194,325,000	.....	.....	.....	.....	194,325,000
1980 to 1989	356,186,960	18,000	20,000,000	.....	.....	376,204,960
1990 to 1999	1,063,219,494	8,842,000	51,346,000	.....	.....	1,123,407,494
2000 to 2009	217,634,600	11,249,200	282,000	5,500,000	.....	234,665,800
2010 and upward	412,682,200	.....	.....	.....	.....	412,682,200
Due on default	12,600,006	.....	.....	9,989,700	.....	22,589,700
Subject to call	6,429,000	1,289,000	.....	4,500,000	.....	12,218,000
Not distributed	214,391	.....	.....	6,320,864	.....	6,535,255
Receipts outstanding for funded debt	.....	.....	.....	.....	.....	6,018
Total outstanding debt Dec. 31, 1925	$7,654,287,809	$1,067,657,028	$302,554,258	$443,256,591	$1,045,704,225	$10,513,465,929



United States Army 14-in. Railroad Mount which Made the Transcontinental Trip from Aberdeen, Md., to Ft. MacArthur, Cal., Last November—Total Weight Distributed Over 14 Axles is 780,000 lb.

The New Rail Specifications and Their Results

By C. W. Gennet, Jr.
Manager, Rail Department, Robert W. Hunt & Co., Chicago

THE new specifications for open-hearth steel rails adopted by the American Railway Engineering Association in 1925 provide for separating the rails, prior to shipment, into six different classes, with the ends painted identifying colors to permit their use in appropriate track locations. The proportion of each classification that might be reasonably anticipated has been an important question, for naturally arrangements have had to be made for the use of each classification, but generally without tangible figures to indicate the amount that might be received.

These specifications have now had a generous trial by a large number of railroads on their current contracts with the different mills. Several of the roads have used the new specifications practically without alteration, and probably close to 200,000 tons of rail have been rolled to it. Other roads have modified the testing details somewhat but allowed the salient features to remain intact. Thus, a total of about 450,000 tons have been rolled this year to the specifications in such a way as to enable fairly accurate records to be obtained of the amount of each classification actually shipped.

The results on this large tonnage from the different mills are:

Classification as provided for by Section 17 of the AREA 1925 specification	Ends of Rail Painted	Average Percent of Shipments From All Mills	Percentage Range of Shipments From All Mills
No. 2 rails	White	5.8	3.2 to 7.9
"X-rays"	Brown	2.2	.2 to 5.5
"A" rails	Yellow	12.9	7.2 to 22.6
Short length rails	Green	4.1	1.8 to 6.8
High carbon rails	Blue	30.3	28.3 to 36.7
All other rails	No paint	44.6	30.9 to 53.2

It must be emphasized that the above figures give the average results for all shipments from the various mills. Shipments from a single mill may vary considerably from the above, and individual rollings are frequently also wide of either the average or the range above given. Likewise, there may be a large difference in the results of one mill as against another, due of course to special mill conditions such as the size of the ingots cast and perhaps the number of ingots of a heat. But the average figures above represent actual results and show what may be expected in the long run on customary contracts of the usual tonnage with several mills.

The new specifications require that a rejection be made when one of the three test pieces break. This penalty has served largely to restrict the making of high carbon heats and consequently the percentage of blue rails is not as high as might otherwise be the case. Notwithstanding, it is probably sufficient to provide enough high carbon rails for the curvature of average lines.

One of the chief problems confronting the roads is with regard to the disposition of the "A" rails and the "X-Rayls," i.e., the yellow and brown rails. "X-Rayls" are always "A" rails (but under some modifications of the specification, not infrequently "B" or "C" rails) at least one of whose three test pieces on a heat has shown the presence of an interior defect. It has been pointed out repeatedly that each ingot of a heat is a distinct unit or casting, and that testing the top rails of only three of them from a heat to prove, or disprove, the freedom of the whole from piping and segregation is after all a mere gamble. In short, there is a considerable degree of uncertainty concerning the physical and chemical soundness of all "A" rails; while also, the fact that the "A" rails of a particular heat may have been made "X-Rayls," by no means proves that they all contain interior defects. Separating some of the "A" rails into class "X-Rayls" by this system of testing appears to be warranted, but to what extent the majority of "X-Rayls" thus separated out should be considered any more actually defective than the remaining "A" rails is a very debatable question. Eventually a more complete and reliable system of testing must be provided; or else, and preferably, a sufficient top discard from the ingots must be made to insure freedom from unsound metal.

The combined figures above for "A" rails and "X-Rayls" show that roughly 15 per cent of all rails are those from the top of the ingot, and experience on a number of roads has often shown that 50 per cent of all rail failures occur in these top rails. Thus the discard of the top rail metal would very greatly improve the whole situation by giving relief from the split, crushed, flowed, and mashed head rails that require constant watching by the trackmen and frequent renewal at the expense of other maintenance work. Four of the largest rail mills will be equipped by next year to discard completely this "A" rail metal and to utilize it in the form of hot sheared and punched tie plates, and one of those mills for a long time past has been exercising a partial prerogative along those lines of which its orders fortunately permit. Two of the principal railroad systems specified this year that the "A" rail metal should be used for tie plates and while it is confidently expected that this practice will increase, it is manifestly held in check because of the extra price required.

In 1925 there were 1,636,631 tons of rails rolled weighing 100 lbs. per yard and over, and which amounted to about 60 per cent of the total. Fifteen per cent of this, or 245,000 tons, were "A" rails of suspicious metal because of the probability of their being chemically and physically unsound, but these rails were laid in main line tracks to become subject to the heaviest traffic conditions. This large tonnage will unquestionably fail to give anything like the average life of the balance, and based on the records, it will yield at least half of all the failures. This suspicious steel, largely unfit for rails, would have made excellent tie plates and yet fallen far short of being sufficient to provide for the 450,000 tons of tie plates that were produced. If the mills could see their way clear to offer the increased top discard without extra charge on rails of 100 lb. per yard and over, but contingent on the acceptance of tie plates made from it, a vast improvement in rail conditions would be effected.

THE ERIE has asked authority from the Public Utility Commissioners of New Jersey to lease ground at its Jersey City terminal for the erection, by the Seaboard Terminal & Refrigeration Company, a Chicago concern, of an eight-story warehouse and icing plant, the four lower floors to be used by the railroad company as a freight station. The primary object in this enterprise is to provide accommodations for perishable fruit and other perishable freight from the west, with facilities for holding the daily fruit auctions which now are held at one of the Erie pier stations on the New York side of the North River. It is said that 90 per cent of the fruit from the west for New York City comes over the Erie and, with the establishment in Jersey City of a station like that proposed, New York consignees would send their trucks to that station through the new tunnel beneath the North river which is shortly to be completed.

Three-Cylinder Mountain Type Locomotive Built for the Denver & Rio Grande Western by the Baldwin Locomotive Works

Three-Cylinder Mountain Type Locomotive

Built for Denver & Rio Grande Western for heavy passenger service—Tractive force, 75,000 lb.

THE Baldwin Locomotive Works has recently completed an order for ten three-cylinder Mountain-type locomotives for the Denver & Rio Grande Western. These locomotives, one of which was exhibited during the recent convention of the Mechanical Division of the American Railway Association at Atlantic City, are designed to meet the demands of unusually severe operating conditions over a road where the maximum grades are three per cent and the sharpest curves are 16 deg. They develop a maximum tractive force of 75,000 lb. which is exceptional for an eight-coupled design, giving these locomotives a hauling capacity that is exceeded by comparatively few locomotives in freight service.

It was the aim of the designers to obtain maximum capacity in a coal-burning unit of the 4-8-2 type, without exceeding certain specified weights and clearance limits. To accomplish this it was essential that all superfluous weight be omitted and the detail parts are consequently as light as is consistent with the required strength. The total weight of one of these locomotives is 419,310 lb., of which 290,530 lb. is distributed over the drivers, 67,880 lb. on the engine truck and 60,900 lb. on the trailing truck. All three cylinders are 25 in. by 30 in. and the outside diameter of the driving wheels is 67 in. The boiler pressure is 210 lb. per sq. in.

The Three Cylinders Are Cast Separate from Each Other

A novel feature in the design is the construction of the cylinders. The three cylinders are of cast iron and cast separate from each other, the center cylinder being cast in one piece with the saddle. Both sides of the center cylinder casting are flanged to receive the two outside cylinders which are cast from the same pattern. The front frame rails are single, measuring 6 in. in width by 13½ in. in depth. The outside cylinders are bolted securely to the rails and also to the center cylinder casting.

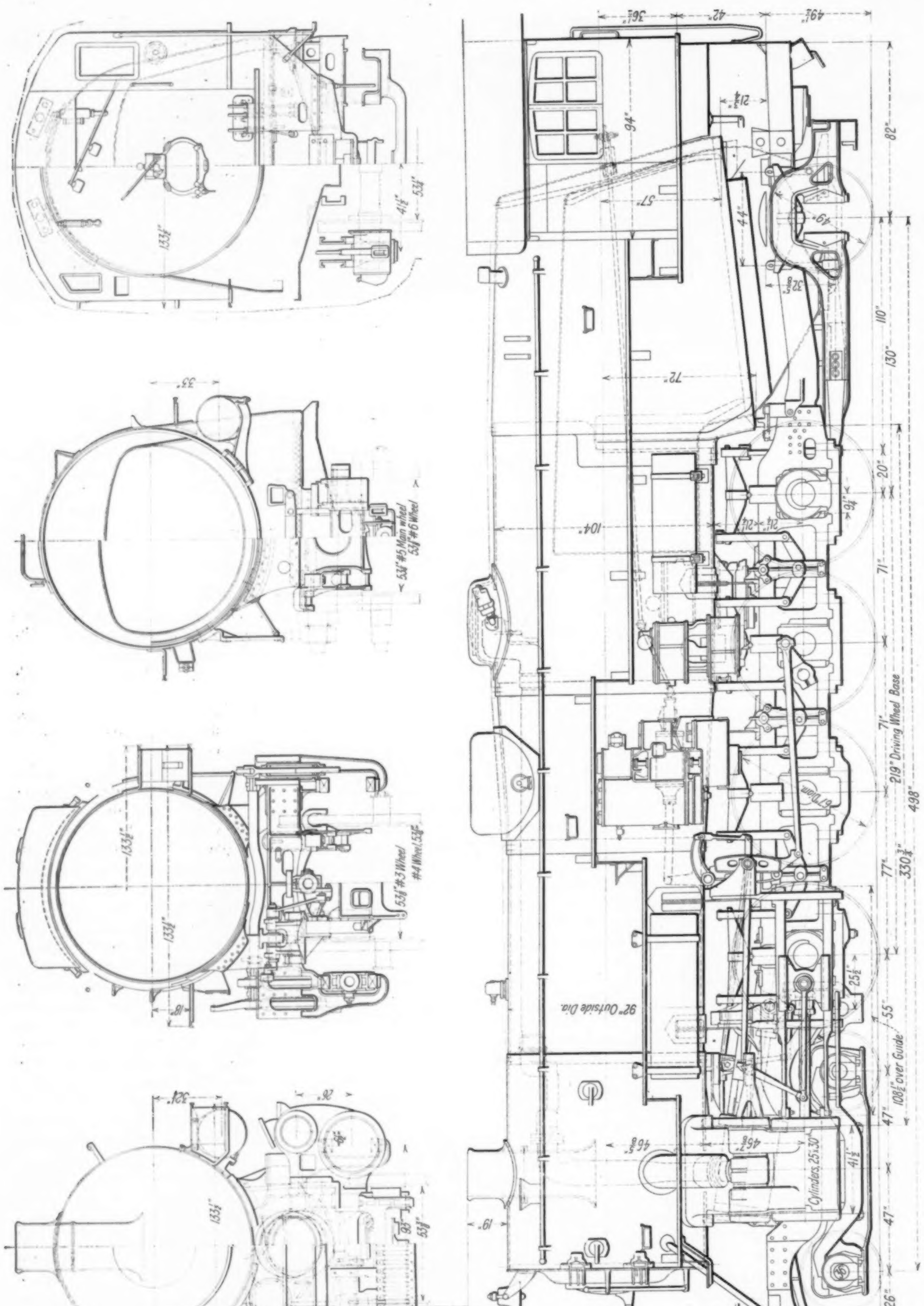
The steam chest for the inside cylinder is placed on the right hand side and receives its steam supply from a branch leading from the right hand steam pipe. The location of this steam chest makes it necessary to run the exhaust passage for the right hand and inside cylinders underneath the latter to the left side of the casting, and then up to the base of the exhaust pipe. All pipe joints subject to live steam pressure are placed outside where they are easily accessible.

The steam distribution to each cylinder is controlled by a 12-in. piston valve having a steam lap of 1⅛ in. and an exhaust clearance of ¼ in. The valves are set with a travel of 6½ in. and a lead of ¼ in., and are controlled by a Walschaert gear. The motion on the left side is arranged in the usual way; but on the right side the main pin has attached to it a double return crank which operates two links, one for the inside cylinder and the other for the right hand outside cylinder. The inside valve receives its lead from the corresponding crosshead and the movement is transmitted from the plane of the latter to that of the outside link through a horizontal shaft which is fulcrumed in a rocker, the bearing of which is bolted to the main frames. This horizontal shaft passes through a crosshead to which the inside valve stem is attached. The three valve motions are controlled simultaneously by a power reverse mechanism.

The outside eccentric rod on the right hand side has a solid end of the usual design at the back end, while the inside rod necessarily has a split brass, which is held in place by a cap secured by two horizontal bolts.

The Running Gear

The piston of the inside cylinder is connected to the second pair of drivers and those of the two outside cylinders to the third pair. The outside crossheads are of the alligator type, while the inside one is of the underhung type, this design being used to provide sufficient clearance above the first driving axle. The outside guides and crossheads are unusually long, being 9 ft. ½ in. in length. The guides are supported by two



Elevation and Cross Section Drawings of the Denver & Rio Grande Western Three-Cylinder Mountain Type Locomotive

bearers, placed respectively ahead of and behind the leading drivers. The lips of the inside guide, which take the pressure when backing up, are separate pieces secured to the upper shoe of the guide by vertical bolts This form of construction is amply strong and facilitates machining the various parts.

The main and side rods are of I-section and made of carbon vanadium hammered steel, annealed. The crank pins are of the same material. Floating bushings are used on the main side rod pins and also on the back ends of the outside main rods. The back end of the inside main rod is of the strap type.

The crank axle, a product of the Standard Steel Works Company, Philadelphia, Pa., is of the built up type in five parts; two end pieces, two crank cheeks and the center pin. The pin and axle portions are of normalized carbon vanadium steel and the crank cheeks are of open hearth carbon steel. Cast steel counterweights, filled with lead, are bolted to the cheeks. The three other driving axles are of carbon vanadium steel.

The engine truck is of the Commonwealth constant resistance type and the trailing truck is of the Delta type.

The Boiler

The boiler, apart from its large dimensions, represents no unusual features of design. It is of the conical type, 92 in. outside diameter at the first course and 104 in. outside diameter at the dome course. The firebox is of corresponding size and volume, having a length of 126⅛ in. and a width of 108 in. which makes a grate area of 95 sq. ft. The depth from the crown sheet to the grate surface at the front of the firebox is 96 in.; it is 73¾ in. at the back. There are 244 flues 2¼ in. in diameter and 64 tubes 5½ in. in diameter, the distance over the tube sheets being 19 ft. 6 in. The total evaporative heating surface is 5,093 sq. ft. of which 402 sq. ft. is in the firebox and 5-ft. combustion chamber, 4,581 sq. ft. in the tubes and flues and 25 sq. ft. and 85 sq. ft. in the arch tubes and thermic syphons, respectively. The superheating surface is 1,495 sq. ft.

The boiler accessories include a superheater having 64 elements, two thermic syphons and du Pont-Simplex stokers. The brick arch is supported on the two syphons and three arch tubes. Five of the locomotives are equipped with Worthington feedwater heaters and the other five with the Elesco. The water level is shown by a Sargent three-face water gage. Barco joints are used in the connections between the engine and tender.

The Tender

The stoker engine is mounted on the forward end of the tender instead of on the locomotive, as is the usual practice. The tender, which weighs 297,090 lb. in working order, has a capacity for 15,000 gal. of water and 25 tons of coal. The tank is of rectangular or water leg construction. The trucks are of the six-wheel type, having 36-in. diameter wheels and 6-in. by 11-in. journals.

The builders were assisted in the design of the locomotives by collaboration on the part of J. S. Pyeatt, president, and W. J. O'Neill, general mechanical superintendent of the Denver & Rio Grande Western.

Three-Cylinder Mountain Type Locomotives

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Railroad	Denver & Rio Grande Western
Builder	Baldwin Locomotive Works
Type of locomotive	4-8-2
Service	Heavy passenger
Cylinders, diameter and stroke	(3) 25 in. by 30 in.
Valve gear, type	Walschaert
Valves, piston type, size	12 in.
Maximum travel	6½ in.
Outside lap	1⅛ in.
Exhaust clearance	¼ in.
Lead in full gear	¼ in.
Weights in working order:	
On drivers	290,530 lb.
On front truck	67,880 lb.
On trailing truck	60,900 lb.
Total engine	419,310 lb.
Total engine and tender	716,400 lb.
Wheel bases:	
Driving	18 ft. 3 in.
Rigid	11 ft. 10 in.
Total engine	41 ft. 6 in.
Total engine and tender	86 ft. 5 in.
Wheels, diameter outside tires:	
Driving	67 in.
Front truck	36 in.
Trailing truck	49 in.
Journals, diameter and length:	
Driving	11½ in. by 14¼ in.
Front truck	7 in. by 14 in.
Trailing truck	9 in. by 16 in.
Boiler:	
Type	Conical
Steam pressure	210 lb.
Fuel, kind	Bituminous
Diameter, first ring, inside	90¼ in.
Firebox, length and width	126⅛ in. by 108 in.
Combustion chamber, length	60 in.
Tubes, number and diameter	64—5½ in.
Flues, number and diameter	244—2¼ in.
Length over tube sheets	19 ft. 6 in.
Grate area	95 sq. ft.
Heating surfaces:	
Firebox and comb. chamber	402 sq. ft.
Arch tubes	25 sq. ft.
Thermic syphons	85 sq. ft.
Tubes and flues	4,581 sq. ft.
Total evaporative	5,093 sq. ft.
Superheating	1,495 sq. ft.
Comb. evaporative and superheating	5,588 sq. ft.
Special equipment:	
Feedwater heater	Worthington (5) Elesco (5)
Stoker	du Pont-Simplex, Type B
Tender:	
Water capacity	15,000 gal.
Fuel capacity	25 tons
Journals, diameter and length	6 in. by 11 in.
General data estimated:	
Rated tractive force, 85 per cent.	75,000 lb.
Factor of adhesion	3.88
Cylinder horsepower (Cole)	3,547
Weight proportions:	
Weight on drivers÷total weight engine, per cent.	69.4
Weight on drivers÷tractive force	3.88
Total weight engine÷cylinder hp.	118
Total weight engine÷comb. heating surface	63.8
Boiler proportions:	
Comb. heat. surface÷cylinder hp. per cent	1.85
Tractive force÷comb. heat. surface	11.4
Tractive force X diam. drivers÷comb. heat. surface	763
Cylinder hp.÷grate area	37.4
Firebox heat. surface÷grate area	5.4

The American Locomotive Ditcher

THE American Hoist & Derrick Company of St. Paul, Minn., has developed the "American" locomotive ditcher which embodies all of the functions of its older ditching machine with the added advantage that it is mounted on a rugged, self-propelling car body. It has sufficient power to handle the ditching train of two dump cars, tender and caboose, at a speed of 19 miles per hour, thus avoiding the necessity of a work locomotive and its crew, which not only effects marked economies in operation but also makes the work independent of any shortage in motive power. In addition to its work as a ditcher it may be used for all the varied purposes of a crane, including the operation of clam shell buckets, and special leads may be furnished whereby the ditcher may be converted into a pile driver. A regular locomotive crane boom up to 50 ft. in length may be

supplied if desired and when thus equipped it has the same capacity as a regular 20-ton crane. Side blocking is provided to prevent excessive sway and outriggers to give greater stability when used for heavy locomotive crane work, are furnished as standard.

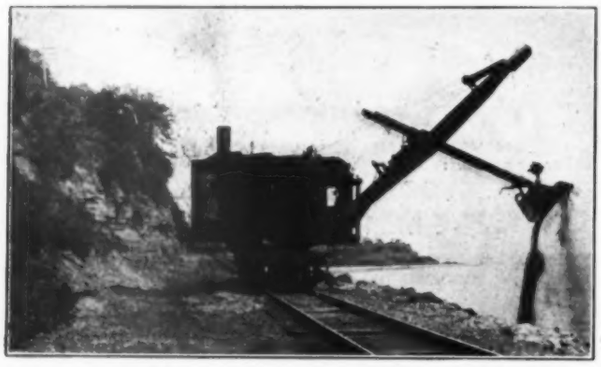
The car body, which is built of structural steel, is carried on two four-wheel swiveling standard gage trucks of the arch-bar type, of 140,000 capacity, with M. C. B. 6-in. by 11-in. journals and 33-in. chilled wheels. The trucks are equipped with roller side bearings and a separate brake cylinder operates on each truck to give ample braking power. A train line and air hose provide for air connections to the other cars in the train, a Westinghouse air pump providing ample pressure. The brake mechanism is arranged for either automatic or straight air operation.

The machinery deck is supported by a heavy gun iron center casting equipped with 20 conical bronze bushed rollers in an enclosed path which is 19 ft. in circumference, thus assuring smooth rotation, a minimum of wear and a wide base of resistance to tipping strains.

The Traveling Engine

The traveling engine is 10 in. by 12 in., of the double cylinder vertical type with Walschaert reversing valve gear, balanced piston valves and cranks set at 90 deg. It has two speeds, one of 19 miles an hour handling its regular train and a low speed of six miles per hour when ditching, making short moves or for use on heavy grades and when handling heavier loads than usual. Power is transmitted by bevel gears and universal joints to the inside axle of each truck and the end axles are driven by side rods set at 90 deg. at the outside ends of the axles, thus making all of the wheels available for traction. The gears are shifted by easily-operated air clutches and the traveling frictions are of the disc type.

The boiler is of the vertical fire tube type, 72 in. in diameter by 9 ft. high, designed for a working pressure of 165 lb., and is said to have a steaming capacity which enables it to keep up the pressure on runs of long distances. It has 278 tubes, each 2¼ in. in diameter and 6 ft. long, and its rated horsepower is 96, based on 10 sq. ft. of heating surface for each horsepower. An automatic injector and a boiler feed pump are provided and either may be used, as desired. A water tank holding 830 gal. is provided on the machinery deck, with means for siphoning from the tank car while traveling. The coal bunker holds 4,500 lb. of coal, or more than a day's supply. If desired, the fire box can be arranged for burning fuel oil, in which case a 400-gal. oil tank is substituted for the coal bunker.



An "American" Locomotive Ditcher Excavating a Ditch on the Chicago, Burlington & Quincy, Where the Material is Cast to the Other Side of the Track

Denver & Salt Lake Operates Agricultural Train

THE Denver & Salt Lake recently operated an agricultural and live stock demonstration train over its lines in northwestern Colorado for the purpose of showing the advantages to be gained through better farming and live stock raising in the intermountain valleys of northwestern Colorado. The railroad was assisted in its undertaking by the State Agricultural College, the Denver Chamber of Commerce, the State Dairy Commissioner, the Colorado Office of Markets, the State Horticulturist, the United States Forest Service, the Western Weighing and Inspection Bureau, and the Moffat Tunnel District Development Association.

The demonstration train consisted of five cars, three of which were day coaches, from which the seats had been removed and exhibits installed, one a standard sleeper for the demonstration crew, and the fifth a cafe car. The vegetable exhibit car was prepared by the Colorado Office of Markets and included a display by the Western Weighing and Inspection Bureau, showing the advantages to be gained by the grower and shipper through proper grading, packing, and inspection. The demonstration work in the car centered principally around head lettuce and potatoes, special attention being directed to the proper loading of refrigerator cars.

Better Farming Train at Steamboat Springs, Col.

The dairy exhibit was prepared by the Office of the Colorado State Dairy Commissioner. The demonstration in the car was based upon the "Iowa breeding experiment" and showed by means of butter cartons the actual increase in volume of production which can be expected in dairy cows by the use of pure-bred sires.

The Colorado Agricultural College presented a livestock exhibit which showed the results of experiments conducted in the Montezuma National Forest wherein controlled breeding was practised and as a result the calf crop of that region was increased 31 per cent per 100 cows. It was also shown that controlled breeding on the range saves a half ton of hay per winter per cow and that the calves, being more uniform, command better prices. This exhibit aroused a great deal of interest in the range country of northwestern Colorado.

The train was operated by the Moffat Road over its entire line in northwestern Colorado and received a good reception. This territory includes that country which will be served by the Moffat tunnel.

General News Department

Net Railway Operating Income of Class I railroads for July was $116,895,311 at the rate of 5.62 per cent, as compared with 4.90 per cent last July. For seven months in 1926 the net was $611,853,632, at the rate of 5.06 per cent, as compared with 4.56 per cent last year.

A. T. C. Rule Suspended for Limited Speeds

The Interstate Commerce Commission has issued a modification of its order of June 29 (*Railway Age*, July 17, page 98) approving, with certain exceptions, the installation of automatic train control on the Chicago, Milwaukee & St. Paul, so as to eliminate Requirement No. 6. Under this paragraph, branch line locomotives operating between Midland Junction and Wabasha, Minn., five miles, and between Cannon Junction and Red Wing, Minn., four miles, were required to be equipped with the device. The change is made on condition that the speed of these branch trains be limited, while on the main line, to a maximum of 30 miles an hour.

A Tariff on Tips

By a circular issued from the Treasury department at Washington last week, employees of the government when traveling on business are required to regulate their expenditures of government money in all details according to a schedule which is prescribed with minute attention to the smallest items, the new rules going into effect on October 1.

Following are some of the maximum allowances: To waiters, 60 cents a day; bell boys and maids in hotels, 30 cents a day; laundry, $1.40 a week; pressing of clothing, $1.25 a week; food and lodging per day, $6 (advanced from $4); baggage porters at hotel, 15 cents for each piece of baggage, but not over 25 cents in all; porters on sleeping cars, 25 cents for each 24 hours; stewards on ocean steamships, $5 for the voyage.

For baths, not over 50 cents a day is to be allowed and for telephone charges, nothing at all, except on satisfactory explanation; and explanation will be required in case of payment for taxi cabs, for drawing rooms in sleeping cars and for traveling on extra fare trains. Parlor cars are not to be used for journeys of less than 25 miles.

President Has Responsibilities

Some of the responsibilities of a railroad president have been outlined in an address by Arthur B. Jones, treasurer of the Chicago & North Western, before the Central Lions Club of Chicago, an abstract of which follows:

"Of the multitude of responsibilities of a railroad president, are any more important than that of increasing among the employees, the 'will to do'? I have been much impressed, particularly in recent years, with the tremendous disbursement for wages each month and am convinced that the return on that expenditure depends largely upon the 'will to do' of the employees. The usefulness of an employee is measured by his enthusiasm and the 'will to do.' No set of rules can increase this. It must come from within and must be the result of, in many cases, a new kind of supervision and sympathetic and kindly encouragement. No great enthusiasm and love for work can be obtained without a high degree of regularity of employment and a constant and even demand for the employee's services. The creating of this is a responsibility of the president, and his spirit, carried through supervisory officers, is the only thing that can achieve a 'will to do.'

"The difficulties of increasing the 'will to do' on a railroad are made very great through the fact that employees are widely scattered and their duties dissimilar. More than 500 different kinds of work are performed. The president can see comparatively few of the large army he is responsible for, and, of course, it is impossible for them to all come together at any time. Much more easy the task if the whole army of 50,000 could come together. I like to imagine all of the North Western men together, including those from Wisconsin and Minnesota, the iron district of Michigan, the plains of Dakota and Nebraska, the mountains of Wyoming, the corn belt of Iowa, the coal fields of Illinois, and the vast terminals of Chicago, touching elbows for the first time, marching in review before their general, the president. Tramp, tramp, they march along, enjoying one another and the first glimpse, perhaps, of some of their superior officers. How much easier, under these circumstances, to instill in their hearts the 'will to do.' And the thought of the responsibility of the president in this connection leads one further. There is another army, vastly larger, made up of the families of the workers, the dependents. For many years the wages of the workers have met their wants. Sicknesses have been encountered and overcome and their education has been paid for by the dollars earned on the North Western. How important that the president and his management maintain that constant, even demand, that regularity of employment, that 'will to do.'"

Congress of American Industry

A Congress of American Industry will be held in the Commercial Museum at Philadelphia during the month of September. An exhibit in connection with it will attempt to portray the industrial progress of the United States during the past 150 years. It will be divided into 10 episodes, each illustrating a period of 15 years. There will be two sessions on each day, one beginning at 9:30 a. m., and the other at 2:00 p. m. The Congress will open on September 7 and will extend to the 24th.

Among those sessions which may be of special interest to railroad men are the following:

September 7, 2:00 p. m.	Natural Resources. Hon. Herbert C. Hoover, Secretary, Department of Commerce.
September 9, 9:30 a. m.	Research. Prof. Alexander Silverman, University of Pittsburgh.
September 10, 2:00 p. m.,	The Engineer. Dr. Dexter S. Kimball, Cornell University.
September 14, 9:30 a. m.	Power and Its Distribution. Gen. Guy E. Tripp, chairman of board, Westinghouse Electric & Manufacturing Company.
September 14, 2:00 p. m.	Illumination. Dr. William C. L. Eglin, president, The Franklin Institute.
September 15, 9:30 a. m.	Transportation. Samuel Rea.
September 15, 2:00 p. m.	Communication. Gen. J. J. Carty, vice-president, American Telephone & Telegraph Company.
September 16, 9:30 a. m.	The Financier. Daniel Crissinger, governor, Federal Reserve Board.
September 16, 2:00 p. m.	The Distributor. Albert L. Salt, president, Graybar Electric Company.
September 21, 9:30 a. m.	Industrial Associations. John E. Edgerton, president, National Association of Manufacturers.
September 21, 2:00 p. m.	The Employee, His Responsibilities. Hon. James J. Davis, Secretary of Labor.
September 22, 9:30 a. m.	The Employer, His Responsibilities. Charles Piez, president, Link-Belt Company.
September 22, 2:00 p. m.	Labor. William Green, president, American Federation of Labor.
September 23, 9:30 a. m.	Industrial Management. Henry S. Dennison, president, Dennison Manufacturing Company.
September 24, 9:30 a. m.	Human Relationships. Thomas E. Mitten, president, Mitten Management.
September 24, 2:00 p. m.	The Future. Ernest T. Trigg, president, John Lucas & Co., Inc.

Further information about the congress may be obtained from George W. B. Hicks, executive secretary, Chamber of Commerce building, 12th and Walnut streets, Philadelphia, Pa.

Steel Treaters' Convention

The eighth annual convention of the American Society for Steel Treating and the National Steel and Machine Tool Exposition, to be held at Chicago the week of September 20, is expected to bring together the largest assembly of men interested in steel and its treatment that has ever gathered in one city. All

technical sessions will be held at the Drake Hotel, September 20-24, inclusive, and the exposition of steel manufacturing and equipment processes by 325 exhibitors will occupy the entire capacity of the Municipal Pier, or over 80,000 sq. ft. It is estimated that 5,000 hp. will be required to drive the machine tool section alone.

A number of papers of much interest and potential value to railroad men will be presented at the technical sessions. The Monday afternoon session will be devoted to three papers covering various phases of the fatigue failure of metals, principally steel. At the Tuesday morning Steel Melting Session, a paper on "Hair Cracks in Steel Rails" will be read. On Wednesday morning, Dr. William M. Guertler, Germany, will discuss "The Corrosion Resistance of Steel," two papers on wear resistance being presented in the afternoon. Seven papers of a more or less technical nature will be presented on Thursday. On Friday two papers, "Failure of Bolt Steels" and "Internal Stresses in Quenched Steel," will probably be of most interest to railroad men. On Friday afternoon a symposium on "Hardness Testing" will be held.

An important feature of the convention will be the specially conducted tours to a number of important manufacturing industries in the Chicago territory. The itinerary will include trips to the Buda Company, the Wyman Gordon Company, the tractor works of the International Harvester Company, the American Forge Company, the Inland Steel Company, the Youngstown Sheet & Tube Co., the Pettibone Mulliken Company, the Western Electric Company, the Interstate Iron & Steel Co., the Illinois Steel Company, the Pyrotung Company, the Columbia Tool Steel Company and the Armour Institute of Technology. A carefully-prepared program of entertainment has been developed, the feature of which will be the annual banquet at the Drake Hotel on Thursday evening. At this meeting Elbert H. Gary and Charles M. Schwab will receive certificates of election to honorary membership in the American Society for Steel Treating; the Henry Marion Howe medal will be awarded to the author of the best paper published in the society's transactions during the past year; and honorary membership will be awarded to Arthur G. Henry, Chicago, one of the originators of the society and known as the father of the exposition.

OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 186 Steam Roads, Including 13 Switching and Terminal Companies)

For the Month of June, 1926 and 1925

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	236,937.75	236,826.89	59,260.62	59,484.75	5,554.39	5,548.82	38,895.28	38,712.51	133,227.46	133,080.81
Revenues:										
Freight	$396,687,190	$366,142,920	$180,072,120	$165,468,118	$21,205,933	$18,577,594	$52,309,717	$48,586,567	$143,099,420	$133,510,641
Passenger	a 92,381,184	b 92,628,192	46,256,664	45,453,069	1,818,048	1,871,694	12,149,603	11,743,618	32,156,869	33,559,811
Mail	7,739,501	7,882,714	2,937,071	3,014,807	193,238	212,935	1,179,125	1,137,483	3,430,067	3,517,489
Express	12,721,866	11,897,818	6,049,569	5,429,963	275,678	282,310	1,514,340	1,594,864	4,882,279	4,590,681
All other transportat'n	17,977,004	17,048,786	10,393,967	9,883,221	217,643	197,754	928,340	882,208	6,437,054	6,085,603
Incidental	11,710,496	10,765,714	5,863,381	5,135,979	427,393	349,561	1,155,392	1,072,378	4,264,330	4,207,796
Joint facility—Cr.	1,073,324	851,779	448,657	374,761	15,702	18,022	145,977	130,786	462,988	328,210
Joint facility—Dr.	425,880	196,864	127,137	74,784	2,939	2,981	33,360	33,021	262,444	86,078
Ry. operat'g revenues	539,864,685	507,021,059	251,894,292	234,685,134	24,150,696	21,506,889	69,349,134	65,114,883	194,470,563	185,714,153
Expenses:										
Maintenance of way and structures	79,944,773	74,728,875	33,943,787	30,874,468	3,509,209	2,969,357	10,570,362	10,297,675	31,921,415	30,587,375
Mainten'ce of equipm't	106,184,898	103,159,577	51,724,853	49,393,516	4,867,861	5,010,257	13,991,784	13,222,073	35,600,400	35,533,731
Traffic	9,872,592	9,082,634	3,574,236	3,336,042	252,852	233,805	1,707,060	1,559,219	4,338,444	3,953,568
Transportation	175,189,410	170,639,621	83,411,382	80,118,066	5,965,518	5,783,613	23,438,841	22,226,704	62,373,569	62,511,238
Miscellaneous operat'ns	4,876,965	4,610,252	2,258,656	2,033,969	86,951	82,692	506,502	442,949	2,024,856	2,050,702
General	15,868,516	14,812,697	7,232,211	6,527,974	672,956	495,238	2,026,424	1,968,106	5,936,925	5,821,379
Transportation for investment—Cr.	1,746,703	969,344	231,289	132,144	70,822	47,548	329,917	165,601	1,114,675	624,051
Ry. operat'g expenses	390,190,451	376,064,312	181,913,836	172,151,831	15,284,525	14,527,414	51,911,056	49,551,125	141,081,034	139,833,942
Net revenue from railway operations	149,674,234	130,956,747	69,980,456	62,533,303	8,866,171	6,979,475	17,438,078	15,563,758	53,389,529	45,880,211
Railway tax accruals	32,966,345	29,902,133	14,481,539	13,248,570	1,580,031	1,257,242	4,260,968	3,844,975	12,643,807	11,551,346
Uncollectible ry. rev's.	103,489	149,457	41,434	78,301	1,509	3,321	19,468	17,011	40,988	50,824
Ry. operating income	116,604,400	100,905,157	55,457,483	49,206,432	7,284,541	5,718,912	13,157,642	11,701,772	40,704,734	34,278,041
Equipm't rents—Dr. bal.	7,087,333	6,336,972	4,501,134	3,918,246	d 659,600	d 508,698	510,393	474,593	2,735,406	2,452,831
Joint facility rent—Dr. balance	2,181,412	2,419,612	1,034,985	1,293,158	89,074	75,726	200,463	188,095	856,890	862,633
Net railway operating income	107,335,655	92,148,573	49,921,364	43,995,028	7,855,067	6,151,884	12,446,786	11,039,084	37,112,438	30,962,577
Ratio of expenses to revenues (per cent)	72.28	74.17	72.22	73.35	63.29	67.55	74.85	76.10	72.54	75.30

For Six Months Ended with June, 1926 and 1925

Average number of miles operated	237,040.02	236,823.09	59,351.56	59,538.87	5,546.23	5,537.42	38,890.44	38,701.19	133,251.79	133,045.61
Revenues:										
Freight	2,240,833,857	2,121,166,443	1,007,672,622	958,181,187	116,484,425	102,410,945	327,379,283	301,784,723	789,297,527	758,789,588
Passenger	c 504,680,493	e 498,996,895	247,476,017	243,955,985	10,922,265	11,214,187	80,626,564	74,316,167	165,655,647	169,510,556
Mail	47,419,443	48,099,493	17,931,259	18,450,714	1,256,706	1,270,141	7,156,479	6,900,213	21,074,999	21,478,425
Express	70,249,291	69,503,562	33,146,802	33,091,638	1,538,684	1,667,068	10,303,574	10,363,980	25,260,231	24,380,876
All other transportat'n	100,078,958	96,521,616	56,624,891	54,887,700	1,263,426	1,200,581	6,164,488	5,801,240	36,026,153	34,632,095
Incidental	61,235,697	58,374,041	30,978,465	28,921,637	2,366,221	2,062,735	8,253,483	7,394,069	19,637,528	19,995,600
Joint facility—Cr.	6,378,286	5,142,146	2,597,033	2,298,232	83,204	98,503	857,002	804,193	2,841,047	1,941,218
Joint facility—Dr.	2,315,162	1,257,185	790,318	581,570	13,686	12,940	200,740	204,386	1,310,418	458,289
Ry. operat'g revenues	3,028,560,863	2,896,547,011	1,395,636,771	1,339,205,523	133,901,245	119,211,220	440,540,133	407,160,199	1,058,482,714	1,030,270,069
Expenses:										
Maintenance of way and structures	413,138,797	388,416,129	172,632,916	163,723,909	18,302,978	16,677,400	61,929,505	57,278,261	160,273,398	150,736,559
Mainten'ce of equipm't	640,866,306	630,227,143	308,931,814	304,280,839	29,483,968	29,181,243	84,870,463	79,056,567	217,580,061	217,708,494
Traffic	55,898,839	51,685,694	20,211,169	19,111,997	1,473,680	1,358,170	10,215,456	9,310,857	23,998,534	21,904,670
Transportation	1,077,252,604	1,062,518,864	511,556,061	502,340,060	36,238,108	34,780,222	154,525,725	143,267,523	374,932,710	382,131,059
Miscellaneous operat's	27,315,129	25,571,594	12,698,573	11,821,563	567,335	540,677	3,674,364	3,220,531	10,374,857	9,988,823
General	92,583,874	86,919,980	42,600,086	38,412,979	3,018,378	2,833,072	11,968,543	11,302,395	34,996,867	34,371,534
Transportation for investment—Cr.	7,204,161	5,449,741	868,955	854,661	197,237	227,407	1,424,621	982,937	4,713,348	3,384,736
Ry. operat'g expenses	2,299,851,388	2,239,889,663	1,067,761,664	1,038,836,686	88,887,210	85,143,377	325,759,435	302,453,197	817,443,079	813,456,403
Net revenue from railway operations	728,709,475	656,657,348	327,875,107	300,368,837	45,014,035	34,767,843	114,780,698	104,707,002	241,039,635	216,813,666
Railway tax accruals	182,474,171	168,928,467	74,631,649	69,479,061	9,197,192	7,437,385	25,996,362	23,319,511	72,648,968	68,692,510
Uncollectible ry. rev's.	819,378	864,320	413,237	397,956	19,257	31,655	97,071	110,910	289,813	323,799
Ry. operating income	545,415,926	486,864,561	252,830,221	230,491,820	35,797,586	27,298,803	88,687,265	81,276,581	168,100,854	147,797,357
Equipm't rents—Dr. bal.	38,906,407	36,136,698	22,662,199	20,705,605	d 3,866,167	d 2,815,525	8,389,226	5,256,483	11,721,149	12,990,135
Joint facility rent—Dr. balance	11,642,300	11,329,447	5,102,892	5,265,303	585,221	544,182	733,558	679,417	5,220,629	4,840,545
Net railway operating income	494,867,219	439,398,416	225,065,130	204,520,912	39,078,532	29,570,146	79,564,481	75,340,681	151,159,076	129,966,677
Ratio of expenses to revenues (per cent)	75.94	77.33	76.51	77.57	66.38	71.01	73.95	74.28	77.23	78.96

a Includes $3,765,967 sleeping and parlor car surcharge. b Includes $3,503,645 sleeping and parlor car surcharge. c Includes $20,021,804 sleeping and parlor car surcharge. d Deficit or other reverse items. e Includes $18,335,743 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Meetings and Conventions

Equipment Painting Convention at Detroit

The fifth annual meeting of the Equipment Painting Section, American Railway Association will be held at the Book-Cadillac Hotel, Detroit, Mich., September 14, 15 and 16. The following is a program of the sessions for each of the three days:

TUESDAY, SEPTEMBER 14, 1926

Prayer.
Address of Welcome—Mayor of Detroit.
Address—F. H. Alfred, president, Pere Marquette.
Report of Committee of Direction.
Appointment of Miscellaneous Committees.
Unfinished Business.
New Business.
Report of Committee on Nominations.
Report of Committee No. III—Shop Construction and Equipment.
Report of Committee No. IV—Maintenance and Care of Paint and Varnish at Terminals.

WEDNESDAY, SEPTEMBER 15, 1926

Report of Committee No. I—Tests.
Election of Officers.
Individual Paper—Lacquer Finish—Arthur Orr, Commercial Solvents Corporation.

THURSDAY, SEPTEMBER 16, 1926

Report of Committee No. II—Standards—Car and Locomotive.
Report of Committee No. V—New Developments in Equipment Painting with Economies Involved.
Report of Committee No. VI—Ornamentation of Cars and Locomotives.

The following list gives name of secretaries, dates of next or regular meetings and places of meetings.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 24, 1927, Mayflower Hotel, Washington, D. C. Exhibited by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—F. Speer, 1021 Filbert St., Philadelphia, Pa. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF ENGINEERS.— M. E. McIver, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—J. D. Gowin, 112 W. Adams St., Chicago. Annual meeting, September, 1926.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 S. Michigan Ave., Chicago. Next meeting, June 21-23, 1927, Mackinac Island, Mich.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 28-29, 1926, Hot Springs, Ark.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Annual convention, June, 1927, San Francisco.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—T. E. Welsh, Chicago, North Shore & Milwaukee, Highwood, Ill. Next meeting, October 12-14, 1926, Detroit, Mich.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 292 Madison Ave., New York. Annual convention, October 4-8, 1926, Cleveland, Ohio.

AMERICAN RAILROAD MASTER TINNERS' COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—H. J. Forster, 30 Vesey St., New York, N. Y.

Division I.—Operating—J. C. Caviston, 30 Vesey St., New York.

Freight Station Section (including former activities of American Association of Freight Agents).—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill. Annual convention, May 10-14, 1927, Memphis, Tenn.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association.)—J. C. Caviston, 30 Vesey St., New York, N. Y.

Safety Section.—J. C. Caviston, 30 Vesey St., New York. Next meeting, April 19-21, Chicago.

Telegraph and Telephone Section (including former activities of the Association of Railroad Telegraph Superintendents).—W. A. Fairbanks, 30 Vesey St., New York. Next meeting, Sept. 21-23, 1926, New Ocean House, Swampscott, Mass.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Annual convention, March 8-10, 1927, Chicago. Exhibit by National Railway Appliances Association, March 7-10.

Construction and Maintenance Section.—E. H. Fritch.

Electrical Section.—E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York, N. Y. Next meeting, September 7-9, Hotel Ambassador, Los Angeles, Cal.

Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Next meeting, September 14-16, 1926, Book-Cadillac Hotel, Detroit, Mich.

Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association.)—W. J. Farrell, 30 Vesey St., New York, N. Y. Exhibit by Railway Supply Manufacturers' Association.

Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

Car Service Division.—C. A. Buch, 17th and H Sts., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Annual convention, October 12-14, 1926, Richmond, Va. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—H. W. Byerly, General Immigration Agent, Northern Pacific, St. Paul, Minn.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual convention, March 8-10, 1927, Chicago. Exhibit by National Railway Appliances Association, March 7-10.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C. M. & St. P. Ry., 11402 Calumet Ave., Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, 1319-21 F St., N. W., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—George T. Seabury, 29 W. 39th St., New York. Regular meetings 1st and 3rd Wednesday in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, Marion B. Richardson, Associate Mechanical Editor, *Railway Age*, 30 Church St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 10 East Huron St., Chicago, Ill. Biennial convention, July 18, 1927.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—E. J. Stocking, 111 West Washington St., Chicago. Annual meeting, January 25-27, 1927, Nashville, Tenn.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, District Claim Agent, Northern Pacific Ry., St. Paul, Minn. Annual convention, 1927, New Orleans, La.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago. Annual meeting, October 26-29, 1926, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H Sts., N. W., Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—S. A. Witt, Detroit Lubricator Co., Chicago. Meeting with International Railway General Foremen's Association, September 7-10, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—Fred M. Condit, Fairbanks, Morse & Co., Chicago. Meeting with American Railway Bridge and Building Association, October 12-14, Richmond, Va.

CANADIAN RAILWAY CLUB.—C. R. Crook, 129 Charron St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF LOS ANGELES.—J. W. Krause, 514 East Eighth St., Los Angeles, Calif. Regular meetings, second Friday of each month, 514 East Eighth St., Los Angeles.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—R. E. Giger, 721 North 23rd St., East St. Louis, Ill. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2nd Thursday each month, except June, July, August, Hotel Statler, Buffalo, N. Y.

CHICAGO CLAIM CONFERENCE. Personal Injury Section.—F. L. Johnson, Chicago & Alton R. R., 340 Harrison St., Chicago. Meets 12:30 p. m., first Monday each month, Sherman Hotel, Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago. Next convention, September 21-23, Hotel Sherman, Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—Bradley S. Johnson, W. H. Miner, Rookery Bldg., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—D. R. Boyd, 811 Union Central Bldg., Cincinnati, Ohio. Meetings, 2nd Tuesday in February, May, September and November.

CLEVELAND STEAM RAILWAY CLUB.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings, first Monday each month, Hotel Hollenden, Cleveland.

EASTERN RAILROAD ASSOCIATION —E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, 1927, Buffalo, N. Y. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—W. R. Walsh, Ewald Iron Co., Louisville, Ky.

INTERNATIONAL RAILWAY CONGRESS.—Office of Permanent Commission of the Association, 74 rue du Progrès, Brussels, Belgium. General secretary, P. Ghilain. Next session of the Congress, Spain, 1930.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. B. Hutchison, 1809 Capitol Ave., Omaha, Neb. Annual convention, May 10-13, 1927, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall 1061 W. Wabash Ave., Winona, Minn. Annual convention, September 7-10, 1926, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—W. H. Harris, 343 S. Dearborn St., Chicago. Earl E. Thulin, assistant secretary, 715 Peoples Gas Bldg., Chicago. Meets with International Railway Fuel Association.

MASTER BOILER MAKER'S ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next annual convention, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Div. V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Div. V.)

MOBILE TRAFFIC AND TRANSPORTATION CLUB.—T. C. Schley, 71 Conti St., Mobile, Ala. Regular dinner meetings 6 p. m., on 2nd and 4th Monday of each month, Cawthon Vineyard, Mobile, Ala.

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—F. A. Morse, vice-president, Potosi Tie & Lumber Co., St. Louis, Mo. Next convention, 1927, Nashville, Tenn.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Annual convention, November 9, 1926, Asheville, N. C.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL HIGHWAY TRAFFIC ASSOCIATION.—Elmer Thompson, 12 East 53rd St., New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 845 South Wabash Ave., Chicago. Annual exhibition, March 7-10, 1927, at convention of American Railway Engineering Association.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: E. R. Cott, Safety Agent, Hocking Valley Ry., Columbus, Ohio. Annual Congress, October 25, Detroit, Mich.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2nd Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July and August.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Fine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

PURCHASES AND STORES DIVISION.—(See American Railway Association, Division VI.)

RAILWAY ACCOUNTING OFFICERS ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June, 1927, Denver, Colo.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 1406 Packard Bldg., Philadelphia, Pa. Annual meeting, November, 1926, Hotel Commodore, New York.

RAILWAY CAR MANUFACTURERS' ASSOCIATION.—W. C. Tabbert, 61 Broadway, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—Edward Wray, 9 S. Clinton St., Chicago. Annual meeting with Association of Railway Electrical Engineers, October 27-30, Chicago.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—F. W. Venton, Crane Co., 836 S. Michigan Ave., Chicago. Meeting with Traveling Engineers' Association, September 14-17, Hotel Sherman, Chicago.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md. Annual meeting, October 12-14, 1926, New Orleans, La.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, A. R. A.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I, September 21-23, 1926.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa. Next meeting, September 24-25, 1926, White Sulphur Springs, W. Va.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Next convention, September 21-23, 1926, Auditorium Hotel, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2nd Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHEASTERN CARMEN'S INTERCHANGE ASSOCIATION.—Clyde Kimball, Inman Shops, Atlanta, Ga. Meets semi-annually.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3rd Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. L. Carrier, Car Serv. Agent, Tenn. Cent. Ry., 319 Seventh Ave., North Nashville, Tenn.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—W. R. Mau, Vanadium Alloys Steel Co., Latrobe, Pa.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association, September 21-23, Chicago.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Annual meeting, September 14-17, 1926, Hotel Sherman, Chicago. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 189 West Madison St., Chicago. Regular meetings, 3rd Monday each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago, Ill.

Traffic News

The Boston & Maine now has 14 off-line agencies, having recently appointed C. H. Keleher general agent at Philadelphia, Pa.

The fifteenth regular meeting of the Southwest Shippers' Advisory Board will be held at Chattanooga, Tenn., on September 10.

The Southern Railway has reported moving northward from Georgia since May 23, a total of 10,870 cars of peaches, or more than 3,000 cars above any former record. A heavy watermelon crop has been moved at the same time. Of the peaches, 4,794 cars went to the east through Potomac Yards; 4,570 through Chattanooga; 31 to the west through Birmingham and 65 to Florida. The Southern has also carried 1,677 cars from East Tennessee, 1,251 from North Carolina and 242 from other places, making a total movement of 14,040 cars of peaches.

Motor Transport News

Motor Transport Hearing at Washington Postponed

The commission has postponed until October 25 the hearing in its motor bus and truck investigation set for September 29 at Washington. It has also extended to September 20 the time provided for respondents to reply to its questionnaire.

Railroad Motor Transport Conference Elects Officers

A. P. Russell, vice-president of the New York, New Haven & Hartford was elected chairman of the Railroad Motor Transport Conference at the first meeting of the conference in Providence, R. I., on August 26. T. B. Wilson, supervisor of transportation of the Southern Pacific; G. C. Woodruff, assistant freight traffic manager of the New York Central; and N. D. Ballantine, assistant to the president of the Seaboard Air Line, were elected vice-chairmen. F. J. Scarr, supervisor of motor service of the Pennsylvania, was elected secretary and treasurer. R. N. Van Doren, vice-president and general counsel of the Chicago & North Western; A. Hatton, general superintendent of transportation of the Canadian Pacific; H. F. Fritch, passenger traffic manager of the Boston & Maine; J. G. Drew, vice-president of the Missouri Pacific; C. S. Lake, assistant to the president of the Chesapeake & Ohio; and W. L. Campbell, assistant to the vice-president of the Erie, were elected members of the executive committee.

Baltimore & Ohio Starts Bus Lines in New York

On August 29 the Baltimore & Ohio commenced operation of its passenger trains to the Jersey City terminal of the Central of New Jersey instead of the Pennsylvania station, New York, and at the same time inaugurated its new bus service from train side to its Pershing square bus terminal opposite the Grand Central station. An article describing this operation appeared in the *Railway Age* of August 28.

Officers of the railroad and guests were entertained in New York on August 27, when a trial run was made over the motor bus route. A special train carrying officers and guests from Washington, Wilmington, Baltimore and other points served by the road, arrived at the Jersey Central terminal at 2:25 p. m., standard time, where it was met by seven of the new fleet of buses. The buses were ferried to Twenty-third street whence they proceeded to the Waldorf-Astoria Hotel, where a stop was made. The fleet then proceeded to the bus terminal at Pershing square opposite Grand Central and for a sight-seeing tour of the city. Later, a dinner was served at the Waldorf-Astoria followed by a theater party. Approximately 150 persons were present at the dinner and theater party, while nearly 90 persons went on the bus trip.

Commission and Court News

Interstate Commerce Commission

The Great Northern, the Northern Pacific and the Minneapolis, St. Paul & Sault Ste. Marie have applied to the commission for a reargument of the case in which the commission recently found not justified a proposed increase in freight rates on milk and cream between points in the Northwest.

The commission has denied the petition of New England commercial interests which asked it to widen the scope of its anthracite coal-rate investigation in order to include rail rates on ex-tidewater coal from New England ports to interior New England. The commission also denied a petition that it separate the issues in the general proceeding so as to expedite consideration of the New England request for the establishment of joint all-rail rates and routes on bituminous and semi-bituminous coal from West Virginia fields to New England. The proceeding has been assigned for further hearing at New York on October 6 before Commissioner Campbell and Examiner Koch.

Change in Oil Rate Decision Asked

Modification of the recent decision of the Interstate Commerce Commission readjusting oil rates from the Southwest is asked in a petition filed by the Chicago, Milwaukee & St. Paul, Minneapolis & St. Louis, Chicago Great Western, Chicago & North Western, Chicago, St. Paul, Minneapolis & Omaha, Great Northern, Northern Pacific, Minneapolis, St. Paul & Sault Ste. Marie, Chicago, Burlington & Quincy and Illinois Central. They state that while the report of the commission may result in a total increase in revenue on the oil traffic affected, the increase would go to the southwestern lines and that the destination lines would be adversely affected. They also point out that the present policy of regulation "apparently contemplates that the railroads shall not be permitted to obtain much additional revenue from farm products" and that under such circumstances it seems inequitable that reductions should be made in oil rates, which have such a slight effect on the movement or price of the product.

The petitioners request that the report of the commission be changed as to the rates on refined petroleum to Lincoln and Omaha, Neb., Sioux City, Ia., Sioux Falls, S. D., St. Paul and Duluth, Minn., and Fort Dodge and Mason City, Ia., and points grouped therewith. They also ask that the fuel oil rate be made 85 per cent of the refined oil rate instead of 80 per cent.

Court News

Delay in Export Grain—Injury Must Be Shown

Where export wheat was delayed but no difficulty in filling any contract of sale was caused thereby, and the shippers' business was not detrimentally affected, the Kansas Supreme Court held that the shipper was only entitled to nominal damages.—Craig v. St. L.-S. F. (Kan.) 242 Pac. 117.

Goods Destroyed by Fire When Detained Without Excuse

The Oklahoma Supreme Court holds that where, after goods arrived at destination, the railroad, on demand of the consignee, without sufficient excuse has refused to deliver them, and several days afterwards a fire destroys them, it is liable for their loss, although the fire was not caused by its negligence.—Schaff v. Roach (Okla.) 242 Pac. 976.

Statutory Limitation of Intrastate Demurrage Charges

New Jersey, 3 Comp. St. 1910, p. 4242, section 47, limiting the demurrage charge on intrastate cars to $1 per day, the New Jersey Court of Errors and Appeals holds that an agreement to pay more would be illegal and unenforceable.—Lehigh Valley v. Waldstein Co. (N. J.) 131 Atl. 884.

Failure to Keep Lookout at Crossing

The Texas Court of Civil Appeals holds that a rule requiring enginemen to take a message from an express messenger is no excuse for their failure to keep a lookout on approaching a crossing; and that "a rule that would command or permit the men on the engine to look back when approaching a public crossing was negligence in itself."—Galveston, H. & S. A. v. Streich (Tex. Civ. App.) 281 S. W. 295.

Absence of Signal or Flagman at Little Used Crossing

The Kansas Supreme Court holds that a railroad was not negligent because it maintained neither an automatic signal nor a flagman at a crossing over a street used only to go to the station of another railroad which operated one train a day each way, and no regulation, ordinance or law required signal or flagman.—Cross v. Rock Island (Kan.) 242 Pac. 469.

Cost of Viaduct Crossing Two Railroads

The Supreme Court of the State of Washington holds that where two railroads agreed that the cost of erecting over their rights of way a viaduct required by a city ordinance should be borne proportionately to the widths of their rights of way, this method of apportioning costs was also a fair method as to the approaches rather than dividing the cost of these equally between them.—Oregon-W. R. & N. v. Pacific Coast (Wash.) 244 Pac. 673.

Injury from Defective Mail-Car Door

In an action by a railway mail service porter for personal injury from broken glass in a defective mail car door which he was trying to open, the Massachusetts Supreme Judicial Court held the evidence sufficient to show that the railroad had opportunity to know of the defect and remedy it, and that the porter did not assume the risk of the unexpected danger of coming in contact with the broken glass.—Dunning v. N. Y. C. (Mass.) 150 N. E. 853.

Contributory Negligence at Crossing

The Ohio Supreme Court holds that where an automobile is stalled upon the track at a crossing and the driver leaves it and stands on the track knowing of the approach of a rapidly moving train, and has time and opportunity to seek a place of safety and fails to do so, a reasonable presumption of negligence contributing to his injury and death arises, requiring that a verdict be directed in the railroad's favor.—Buell v. N. Y. C. (Ohio) 150 N. E. 422.

Meaning of "Crossing" as Used in Texas Statutes

The Texas Court of Civil Appeals holds that the word "crossing" as contained in Rev. Stat. 1911, arts. 6485, 6494, requiring a railroad, after constructing a crossing, to restore the highway to such a state as not to unnecessarily impair its usefulness, and to keep the crossing in repair, means the entire structure, including the necessary approaches, though a part may be outside of the railroad's right of way.—G. H. & S. A. v. Rodriguez (Tex. Civ. App.) 281 S. W. 259.

Delay Reasonable While Considering Garnishment Proceedings

A railroad had freight which the consignee had refused and which the owner directed to be shipped to another destination. The railroad advised him that it "was not in a position to do so" because of garnishment proceedings. Two days later, concluding these proceedings were ineffectual, the railroad made the shipment, which the owner refused to accept. The Minnesota Supreme Court held that the railroad was entitled to a reasonable time in which to act, and that two days' delay was not unreasonable, and did not constitute a renunciation of the shipping contract. The shipper was held liable for freight and other charges.—Davis v. Aslesen (Minn.) 206 N. W. 405.

Railroad Not Compelled to Permit Coal Bin on Right of Way

The Kentucky Court of Appeals holds that a railroad's refusal to allow a coal dealer to construct a coal bin on its right of way, a service which it had allowed to others, was not discrimination, that term applying to the discharge of "carrier service" duties, and not to strictly private ones that the railroad company has a right to either perform or not perform as it sees proper.—Browning v. L. & N. (Ky.) 281 S. W. 490.

"Mixed Train" Under Arizona Full Crew Law

The Arizona Supreme Court holds that a train carrying passengers, baggage, express and mail, but no caboose, with seven regular stopping stations, and also carrying from one to fifteen freight cars, stopping at any station where there was freight to load or unload, was a "mixed train" requiring only one brakeman under the Arizona Full Crew Law, section 2177, and not two, as required for local freight trains under section 2176.—Arizona Eastern v. State (Ariz.) 242 Pac. 870.

Custom of Jumping Freight Trains Not Recognized

The Oklahoma Supreme Court holds that under section 2026, Okla. Comp. Stat. 1921, jumping and riding freight trains, except by employees in discharge of their duty, is prohibited, and evidence tending to prove a custom in this respect for the purpose of excusing or explaining the act of a person who tried to jump and ride a freight train and was injured, for which damages were sought, was incompetent.—Oklahoma, New Mexico & Pacific v. Downey (Okla.) 244 Pac. 173.

Injury from Protruding Bolt—Safety Appliance Act

The Pennsylvania Supreme Court holds, in an action by a brakeman under the Federal Employers' Liability Act, Boiler Inspection Act, and Safety Appliance Act, for injuries sustained by plaintiff when his coat caught on a protruding bolt fastening footboards on the switching engine, that there was no evidence of negligence where the manner of fastening the bolt was not shown to be unusual, and the alleged defect was obvious to all. —Pursglove v. Monongahela, 285 Pa. 27, 131 Atl. 476.

Contract to Reconstruct Telegraph Line

A contract required a railroad to reconstruct a telegraph line when requested by the telegraph company. After destruction of the line by a sleet storm, the railroad and the telegraph company jointly constructed a temporary line. The Michigan Supreme Court holds that the railroad was not liable for the cost of the telegraph company's work, the contract applying to a permanent, not a temporary line.—Western Union v. Detroit & Mackinac, 233 Mich. 1,206 N. W. 520.

Safety Appliance Act—Connection Between Violation and Injury Must Be Shown

In an action under the Federal Safety Appliance Act the Minnesota Supreme Court holds that the fact that a switchman was compelled, because of a defective coupling appliance, to do something he would not have otherwise done, and, while so doing, was injured by something apart from the use of the appliance, does not, of itself, establish causal connection between the violation of the statute and the injury.—Schendel v. Chicago, M. & St. P. (Minn.) 206 N. W. 436.

Use of Appliance for Purpose Not Intended Bars Recovery for Injury

A brakeman suing for injuries from an alleged defective brake ratchet, which he asserted he was using in the discharge of his duty, testified that he was struck by the brake lever when using it to steady himself in passing from one car to another. The Kentucky Court of Appeals held that the court should have instructed the jury to find for the railroad, the evidence showing that if the plaintiff had used the lever for the purposes for which it was intended he would not have been hurt.—L. & N. v. Parsons (Ky.) 281 S. W. 519.

Foreign Railway News

Belgian Railways Offer Stock in New York

The Belgian National Railways Company is offering a block of 10,000,000,000 francs of 6 per cent participating preferred stock in New York as a first step toward the stabilization of the Belgian franc. The Belgian government is giving holders of treasury bonds maturing on December 1, the option of exchanging them for new bonds. The new company will operate the Belgian State Railways on a profit-making basis, the former practice of making them a branch of the administrative part of the government having been discontinued.

New Railway Line Recommended by Colombian Commission

A Colombian commission, appointed to report on the construction of the Ferrocarril Troncal de Occidente has recommended a new railroad line, according to a report from Consul Alfred Theo Burre, Barranquilla, Colombia, made public by the Department of Commerce, from Cartago north along the Cauca Valley to Bolombolo. The proposed road is to extend thence to a point to be determined upon in the vicinity of Canafistula, San Pablo, and Cacares, and thence through the Department of Bolivar to the port of Cartagena.

It has been also recommended that the line between Bolombolo and Puerto Caldas be constructed at once, so that connection may be made with the Caldas Railway, which is in operation between Puerto Caldas and Cartago, the northern terminus of the Pacific Railway. As a result, the Department of Antioquia is signing an agreement with an American company to construct the line from Bolombolo to the southern limit of the Department of Antioquia, according to the consul.

Pacific Locomotives of Fifteen-Inch Gage

The Romney, Hythe & Dymchurch light railway, under construction on the southeast coast of England between Romney and Ashford road, about 8 miles, has been so far completed that the Railway Gazette, London, prints a brief account of the establishment, with pictures of the locomotives, bridges and other structures. This railroad is notable by reason of its narrow gage, 15 inches, and its Pacific type locomotives weighing only about eight tons. The chairman of the company is General Sir Ivor Maxse, K. C. B., C. V. O., D. S. O., and the locomotives and some other features have been designed by Henry Greenly. The locomotives are exact replicas, one-third size, of standard 4-6-2 engines in use in England. Two of these engines, the Green Goddess and the Northern Chief, have been delivered. They were built by Davey, Paxman & Co., Ltd., of Colchester. Two engines of 4-8-2 type are being built and also one 0-4-0, for switching. The Pacifics have cylinders 5¼ in. by 8½ in.; driving wheels 25½ in. in diameter; total length of engine and tender 25 ft. The brakes are automatic vacuum. The passenger cars are semi-open and carry eight persons each.

President of Argentina Reports on Railways

At the opening of the 1926 session of the Argentine Congress on July 1, President Alvear gave a report on the operation of the Argentine railways during the past fiscal year. In his report, President Alvear described railway conditions in general as satisfactory, although revenues were less in most cases than during the previous year. The total length of the Argentine railways is now 23,669 miles, of which 4,350 miles are state-owned. The number of passengers carried during the fiscal year was 140,670,000, an increase of 5 per cent over 1925. A decrease of 8½ per cent in freight traffic during the fiscal year just ended was reported. The total railroad revenue amounted to $250,695,000, a decrease of 5 per cent. Operating expenses during the year amounted to $176,664,000 and net $74,031,000, a decrease of 15 per cent. The net receipts of the Argentine State Railways were $48,076,385, while the expenses for the year amounted to $49,-

063,643. The report cites a number of improvements in line with the policy of extending and modernizing both the privately owned and state owned railways and mentions as examples the construction of the new Central Argentine terminal station at Rosario; the enlargement of the Retiro station and the track elevation of most of the city lines owned by the Buenos Aires & Pacific.

New Zealand Railways Reorganize Stores System

The New Zealand Railways are reorganizing their stores system to promote more efficient handling of supplies and materials, according to the New Zealand Railways Magazine. The work of putting new methods into operation has already been completed in several sub-stores.

The new system which is being installed has resulted from a study of four main problems—adequacy of storage room, simplicity in accounting, prompt delivery and accurate recording. Racks and shelves in the storehouses are now being arranged so that none are higher than can be reached conveniently by the storeman from the floor level, and to permit ample distribution of light to all parts of the storehouse. Passage room is being arranged for to permit the operation of a truck from any part of the building to the delivery door. Supplies and materials are being arranged in compartments, each labeled and provided with a card on which to record each receipt and issue. Other entries on this card indicate the minimum and maximum amount of each material which is permitted to be held in stock. The card thus serves as a reminder to the stores staff as to when, and in what quantities, replacements should be ordered. Under the new system, it is expected that a large amount of waste of materials will be avoided, since all unused materials must be returned to the storehouse for re-issue. The storekeeper has a check to insure this practice. An interchange of stock sheets between the various storehouses throughout New Zealand is called for under the new system, thus increasing the availability of stocks on hand for supplying the needs of other districts, while helping to reduce the proportion of slow moving stores on hand. Practically all the materials and machinery turned out by the New Zealand railway shops are being taken over by the stores department, which will control the quantities manufactured in each of the shops, according to needs in the Dominion.

Austrian Railway Freight Rates Revised

The Austrian Federal Railways have put into effect a new schedule of freight rates, according to Vice Consul C. Warwick Perkins, Vienna, in a report made public by the Department of Commerce. The railway management has estimated that the increase in revenues will be approximately 15,000,000 schillings ($2,150,000) annually; and while for certain classes of merchandise the new rates will be 15 and 18 percent higher than those now in force, the average increase will be only about 5 percent.

The new rate base is intended not only to provide additional revenue, but also to assist the Austrian railways in competition with foreign systems, to promote domestic production and to facilitate competition with foreign merchandise, the consul states. The management states that the new freight rates are lower, compared with pre-war rates, than those now in force in neighboring countries. The Austrian rates are now 12 percent above the pre-war level, while in Germany they are 38 percent, in Czechoslovakia 20 percent, in Switzerland 63 percent and in Hungary 13 percent higher than in 1913.

The general freight schedules and classifications have not been revised for 3 years, with the result that they are now in many instances not in accord with present conditions. The railways have postponed a general revision as long as possible in order not to place an additional burden on Austrian industry, which is suffering from depression.

Ordinary fast freight, on which the charges were so high that shippers were often forced to use slow freight, is now about 20 percent cheaper than formerly; and many classes of articles, including a large number of foodstuffs, have been added to the list of commodities subject to the special (reduced) fast freight rates, which apply to meat, butter, fresh vegetables, eggs, lard, bacon, and coffee. These special fast freight rates have been increased only about 2 percent.

In general, the rate increase has been so distributed as to fall largely on short and medium hauls; the charges for long hauls, on the other hand, have in some cases been reduced.

Equipment and Supplies

Freight Cars

THE INTERSTATE OIL SHIPPERS LINE, Chicago, is inquiring for 40 tank cars.

THE SINCLAIR REFINING COMPANY is inquiring for 16 special type coke cars.

THE CHICAGO, NORTH SHORE & MILWAUKEE is inquiring for four caboose cars.

THE WESTINGHOUSE AIR BRAKE & MANUFACTURING COMPANY is inquiring for five dump cars.

CHESWICK & HARMER, Philadelphia, is inquiring for 10 steel hopper cars of 55 tons capacity.

Motor Vehicles

THE CHICAGO & ALTON has ordered two eight-wheel highway motor coaches from the Versare Corporation, Albany, N. Y.

Machinery and Tools

THE LIMA LOCOMOTIVE WORKS has ordered a 66-in., 300-ton wheel press from the Niles Tool Works Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered a 36-in. Ohio Dreadnaught shaper from Joseph & Ryerson & Son, Inc.

THE CHICAGO & NORTH WESTERN has ordered a 90-in. locomotive journal turning lathe and a 90-in. heavy driving wheel lathe from the Niles Tool Works Company.

Iron and Steel

THE NEW YORK CENTRAL is expected to enter the market within the next few weeks for its 1927 rail requirements.

Signaling

THE PENNSYLVANIA has ordered from the General Electric Company material for substations to be located at Camden, N. J., Hammonton and Atlantic City, to furnish power for automatic train control.

THE CENTRAL VERMONT has contracted with the General Railway Signal Company for the installation of a mechanical interlocking at Burlington, Vt., the crossing of the Rutland; 21 working levers. The order includes six color-light signals.

THE MICHIGAN LIMESTONE & CHEMICAL COMPANY has ordered from the Union Switch & Signal Company material for an interlocking, to be installed by the purchaser, at Rogers City, Mich., the crossing of the Detroit & Mackinac; five working levers.

THE ATLANTIC COAST LINE has ordered from the General Railway Signal Company, 70 complete locomotive equipments and 370 inductors for automatic train control. This system, the intermittent inductive auto manual type, is to be installed from South Rocky Mount, N. C., southward 172 miles, double track, to Florence, S. C., in compliance with the second order of the Interstate Commerce Commission.

THE CENTRAL OF GEORGIA has ordered from the Union Switch & Signal Company material for the improvement of the automatic signal system, on its line, single track, between Macon, Ga., and Fort Valley, 24 miles; the intention being to complete the signaling so that trains can be operated by signal indication only, making possible the disuse of written train orders. The material includes 26 desk circuit controllers, 12 dwarf signals for the outgoing ends of passing tracks, 12 "take-siding" indicators, 2 low voltage switch and lock movements, etc.

Supply Trade News

The Chicago Railway Signal & Supply Company has removed its New York office from 30 Church street to 114 Liberty street.

C. C. Osterhout, chemist and engineer of tests of the **Rome Iron Mills, Inc.,** has been appointed assistant manager of sales, with headquarters at Rome, N. Y.

The executive and general offices of the **Union Tank Car Company** will be moved from New York City to 134 North LaSalle street, Chicago, Ill., effective September 16.

Ralph J. Stayman, district sales manager in charge of the warehouse at Chicago for the **Jones & Laughlin Steel Corporation,** has been promoted to general manager of warehouses, a newly created position.

The Pyrotung Manufacturing Company has been organized recently and a new plant built at 730 W. 50th street, Chicago, for the manufacture of railroad track drills and shop cutting tools. These tools are made by the new Pyrotung process, designed to give unusual toughness and hardness without brittleness. The officers of the new company are: **W. R. Otis,** president; **C. E. Sutten,** vice-president; **B. C. Cleveland,** vice-president and metallurgical engineer, and **C. E. Pynchon,** general manager, formerly manager of the machinery and tool departments of J. T. Ryerson & Son, Inc.

The Waugh Equipment Company, Chicago, has acquired all of the outstanding capital stock of the **Railway Improvement Company,** New York, and will amalgamate the two companies at once, operating the combined companies under the name of the Waugh Equipment Company, maintaining its offices in the Peoples Gas building, Chicago, and Pershing Square building, New York. With the acquisition of the Railway Improvement Company, the Waugh Equipment Company acquires all of the well-known Rico products used extensively throughout the country on practically all electric street railways and steam railroad electrifications. **R. J. O'Brien,** formerly general manager of the Waugh Equipment Company, has been elected vice-president. **H. N. Ransom, W. M. Roche, O. L. Downs, Henry Wiegand** and **G. F. Ferguson** of the Rico sales department, have been added to the Waugh company sales force, and **Colonel L. M. Clark** of the Railway Improvement Company has been attached to the Waugh Company engineering department.

B. M. Cheney, president of **Laughlin & Cheney, Inc.,** Chicago, sales agents for the Verona Tool Works, Pittsburgh, Pa., and other companies, has been appointed district sales manager of the Verona company, with headquarters at Chicago, and the firm of Laughlin & Cheney, Inc., has been dissolved. Mr. Cheney was born on September 27, 1879, at Eldorado, Iowa, and was educated at Iowa State University and Armour Institute, Chicago. He entered railway service in 1900 as an axman on the Burlington, Cedar Rapids & Northern, now a part of the Chicago, Rock Island & Pacific, which position he held until 1902, when he was appointed resident engineer on the Des Moines, Iowa Falls & Northern, now a part of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa. He held the latter position until 1903, when he became an instrument man on the Illinois Central, working in Southern Illinois. From 1904 to 1906, he was assistant chief engineer of the Interurban Railway of Des Moines, Iowa, which position he resigned to enter the employ of the Chicago, Burlington & Quincy as an assistant engineer, with headquarters at Beardstown, Ill. In 1910 he was transferred to Prairie du Chien, Wis., in charge of second track work, and in August, 1914, was promoted to general inspector permanent way and structures. He resigned from this position in February, 1925, to organize the Laughlin & Cheney, Inc., Chicago, with which company he has been connected until his recent appointment.

Obituary

George H. Sargent, president of Sargent & Co., Chicago, died on August 31 in Evanston, Ill., of pneumonia, following a brief illness.

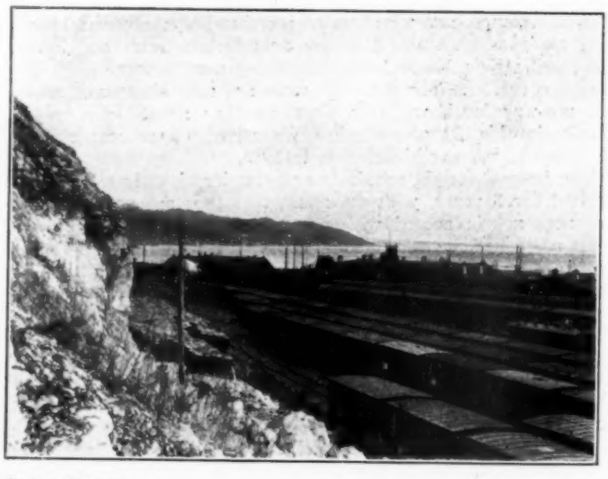
Claude F. Chard, for several years Cleveland district sales manager for the Austin Company, engineers and builders, Cleveland, was instantly killed in an automobile accident near Medina, O., on August 13. Mr. Chard was graduated from Purdue University in 1910, and became associated with the Austin Company in 1918. Before his association with this company Mr. Chard was with the Westinghouse, Church, Kerr Company, in New York.

Trade Publications

HOISTING AND HAULING.—A 16 page booklet entitled "Handy Hoisting and Hauling," has been issued by the Sullivan Machinery Company, 122 South Michigan avenue, Chicago. The service rendered by the Sullivan Turbinair steam and electric portable hoists is described in this booklet which shows many of the uses to which these hoists have been adapted.

THE OHIO BRASS COMPANY, Mansfield, O., has issued catalogue No. 20 (1926-27), a 945-page (6 in. by 9¼ in.) volume bound in cloth, in which all products which this company manufactures are listed, including high tension insulators, pole-line hardware, trolley line and catenary materials, rail bonds for both electric traction and signaling purposes, bonding tools, signal strain insulator fittings, third rail insulators and car equipment specialties including the Tomlinson automatic radial car coupler, and the Tomlinson M. C. B. car coupler for electric traction requirements. Included also is a complete listing of O-B standard brass valves for steam, water, air, gas, oil and vacuum service. An abundance of half-tone illustrations and line drawings are employed to set forth the construction details of these products.

THE PENNSYLVANIA announces that the management contemplates the establishment of a "New Ideas Bureau," and, in an article published in the employees' bi-monthly paper, the Pennsylvania News, all employees, throughout the system, are invited to send in suggestions as to how the new bureau should be organized and what it should do. In each of the three regions, the eastern, the central and the western, a prize of $50 will be awarded for the best plan presented.



Ewing Galloway

Railroad Yards, Shores of Lake Baikal, Soviet Russian Railways

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to Sharp & Fellows, Los Angeles, Cal., for the construction of a 14-mile line from Porphyry, Cal., to Alberhill.

BALTIMORE & OHIO.—A contract has been awarded to the Bates & Rogers Construction Company, Chicago, for the construction of a roundhouse and extensive trackage at Youngstown, Ohio, estimated to cost $750,000.

CHICAGO & NORTH WESTERN.—A contract has been awarded to G. A. Johnson & Son, Chicago, for the construction of a one-story addition to the enginehouse and repair shop at Fremont, Neb., estimated to cost $35,000.

CHICAGO & NORTH WESTERN.—A contract has been let to Joseph E. Nelson & Sons, Chicago, for the construction of a water treating plant including buildings, pipe lines and pumping machinery at New Elm, Minn., estimated to cost $20,000.

CHICAGO, BURLINGTON & QUINCY.—The construction of a one-story locomotive repair shop at Bridgeport, Neb., at a cost of $35,000, is contemplated.

CHICAGO, MILWAUKEE & ST. PAUL.—Plans have been prepared for the construction of a freight and passenger station at Bridgewater, S. D.

CHESAPEAKE & OHIO.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of a power house at Handley, W. Va., estimated to cost $50,000. A contract has also been let to this company for the construction of a washroom and locker room at Peru, Ind., to cost approximately $10,000.

CHICAGO, MILWAUKEE & ST. PAUL.—Contracts have been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of Koyl system water treating plants with capacity of 6,000 gallons per hour at Bird Island, Minn., Summit, South Dakota, and Bardwell and Hawarden, Iowa, and also for a 9,000 gallon per hour plant of the same design at Appleton, Minn., all of which are estimated to cost $95,000. A contract has also been let to the same company for the construction of a pumping station, water treating plant and fire protection facilities at Channing, Mich.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the installation of two cinder conveyors at Rock Island, Ill., and also for the construction of a power house and a storehouse at Burr, Oak (Chicago), which are estimated to cost $65,000.

ERIE.—This company has awarded a contract to the Arthur McMullen Company, New York, for grade crossing elimination at Ridgewood, N. J., estimated to cost $50,000.

GRAND TRUNK.—This company is receiving preliminary estimates on costs for the installation of a direct steaming smoke washing system at its enginehouse at Elston Avenue and Forty-ninth street, Chicago, plans for which have already been prepared.

GULF COAST LINES.—A contract has been awarded for the construction of a Spanish type passenger station at Edinburg, Tex., estimated to cost $35,000.

ILLINOIS CENTRAL.—Bids are being received for the construction of a water station at Thompsonville, Ill.

ILLINOIS CENTRAL.—A contract was awarded to the Coomer & Small Construction Co., Sioux City, Iowa, for the construction of a brick and concrete freight and passenger station at Ackley, Ia., to cost approximately $25,000.

ILLINOIS CENTRAL.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of a pumping station complete with pumps and other facilities at Lowes, Ky., at an estimated cost of $30,000. A contract has also been let to this company for the construction of station facilities and platforms at Blue Island, Ill., and at Lincoln Highway near Matteson, estimated to cost approximately $20,000.

ST. LOUIS-SAN FRANCISCO.—The Interstate Commerce Commission has authorized the construction of an extension of 152 miles from Aberdeen, Miss., to Kimbrough, Ala., to afford a connection, via the Muscle Shoals, Birmingham & Pensacola, to the Gulf of Mexico.

ST. LOUIS SOUTHWESTERN.—A contract has been awarded to Bailey, Burns & Fitzpatrick, Texarkana, Ark., for the construction of a dormitory building at the Cotton Belt Hospital, Texarkana, at a cost of approximately $55,000.

ST. LOUIS-SAN FRANCISCO.—A contract has been awarded to R. E. Carr, Memphis, Tenn., for the rehabilitation of the Muscle Shoals, Birmingham & Pensacola, extending from Kimbrough, Ala., to Pensacola, Fla. Cost of the work is estimated at $2,500,000.

SOUTHERN ILLINOIS & KENTUCKY.—A contract has been awarded to the Railroad Water & Coal Handling Company, Chicago, for the construction of a water station at West Frankfort Junction, Ill., estimated to cost $30,000.

SOUTHERN ILLINOIS & KENTUCKY.—This company, a subsidiary of the Illinois Central, has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a pumping plant and deep well water supply at Reevesville, Ill., at an estimated cost of $45,000.

SOUTHERN PACIFIC.—A contract has been awarded to the W. J. Harris Contracting Company, Houston, Tex., for the construction of 17 miles of extension from Edinburg, Tex., to Falfurrias.

UNION PACIFIC.—Plans are being prepared for the construction of a station at Gering, Neb.

WABASH.—A contract has been let to the Eberhardt Construction Company, Salina, Kan., for the construction of a one-story frame and stucco passenger station, 21 ft. by 59 ft., at Orrick, Mo.

YAZOO & MISSISSIPPI VALLEY.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of a water treating plant with a capacity of 30,000 gallons per hour at Baton Rouge, La.

BUSHEL BASKETS, covered with slats, when used to transport peaches or other fruits in refrigerator cars, ought to have four handles; that is, two slats laid on at right angles, each extending two or three inches over the edge of the basket on both sides. This and other bits of good advice for packers have been made the subject of illustrated posters which have been prepared by the Freight Container Bureau, A. R. A., 30 Vesey street, New York City, and circulated among railroads, especially in the south, to be given to growers of peaches and other large shippers.

Woods Hole-Boston Train, N. Y., N. H. & H., at Brockton, Mass.

Railway Financial News

BOSTON & MAINE.—*Reorganization Plan.*—At a special meeting in Boston on August 27, the stockholders approved by a vote of 611,497 shares all actions taken by officers in connection with the reorganization.

Financing.—The Boston & Maine has petitioned the Department of Public Utilities of Massachusetts to approve an issue of $1,050,000 face value of new refunding bonds in addition to the $37,531,000 of bonds already approved for exchange in the refunding plan. It also asks for an order approving in advance the issue from time to time of further amounts of the new refunding bonds up to, but not exceeding, the aggregate amount of $43,522,000 upon the condition that before any further amount is actually issued a written notice signed by the Old Colony Trust Company shall be filed with the Department of Public Utilities stating that the additional bonds have been surrendered to it to be exchanged for the further amount of new bonds so issued.

CENTRAL OF NEW JERSEY.—*Equipment Trusts.*—The Interstate Commerce Commission has authorized $2,670,000 4½ per cent equipment trust certificates to be sold at 99.517 per cent of par and accrued dividends in connection with the procurement of certain equipment.

CHESAPEAKE & OHIO.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of three short lines in West Virginia, the Sewell Valley, the Loop & Lookout and the Greenbrier & Eastern. The stock of the latter has been acquired by the Union Trust Company of Cleveland and the commission recently announced a proceeding of investigation into the matter, stating that the C. & O., had not applied to it for authority.

CHICAGO & ILLINOIS WESTERN.—*Equipment Trust.*—The Interstate Commerce Commission has granted this company authority to assume obligation and liability for $489,500 equipment trust certificates to be issued by John H. Gulick and sold to the highest bidder, but at not less than par and accrued dividends. The equipment includes 2 locomotives and 300 freight cars costing approximately $689,500.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commisison for authority for an issue of $410,000 of 4¾ per cent equipment trust certificates, to be sold to the highest bidder at not less than par.

DELAWARE & HUDSON.—*Lease of B. R. & P.*—This company's application for authority to lease the Buffalo, Rochester & Pittsburgh has been assigned by the Interstate Commerce Commission for hearing at Washington on September 20 before Examiner Davis.

Segregation Move.—A special meeting of Delaware & Hudson stockholders has been called for October 26 for consideration of a method to transfer the transportation and allied interests of the company to a corporation controlled by complete stock ownership by the Delaware & Hudson Co. This is a further move toward segregation of the company's anthracite mining properties. The decision to hold a special stockholders' meeting was made by the board of managers and is continuation of the authority asked of stockholders by the board of managers at a special meeting May 12, 1925.

DETROIT, TOLEDO & IRONTON.—*Valuation Protest.*—This company, like others, has filed with the Interstate Commerce Commission a protest against the tentative valuation of its properties recently served by the Interstate Commerce Commission, as of 1918. In place of the commission's tentative figure of $12,218,812 as the final value the company claims $23,692,328. It also protests against the making of final valuations as of 1918 by the use of unit prices and costs for labor, materials and money ascertained as of 1914.

IBERIA & VERMILION.—*Erath Line.*—This company has been authorized to acquire and operate a line 12.39 miles long in Vermilion parish, La., owned by the Erath Sugar Company. The line extends from a point 5 miles north of Erath to a station called Boston, 5 miles to the south of that village and thence east about 2 miles.

ILLINOIS CENTRAL.—*Bond Issue.*—Kuhn, Loeb & Co. have purchased, subject to the approval of the Interstate Commerce Commission, $35,000,000 40-year 4¾ per cent gold bonds due August 1, 1966, which they are offering for subscription at 96½ per cent and accrued interest to yield 4.95 per cent to maturity.

The proceeds are to provide the funds necessary for the construction of the Edgewood Cut-off between Fulton, Ky., and Edgewood, Ill., and for other capital expenditures, including the new Paducah terminal and shops and track elevations and station facilities at Jackson and Clarksdale, Miss., and to reimburse the treasury for expenditures heretofore made for such purposes.

The bonds are to be redeemable as a whole, but not in part, at the option of the Illinois Central, upon not less than 60 days' previous notice, on any interest date on or after August 1, 1936, at 102½ and accrued interest up to and including August 1, 1961, and thereafter at a premium equal to ¼ per cent for each six months between the redemption date and the date of maturity.

KANSAS CITY SOUTHERN.—*Merger Hearings.*—The Interstate Commerce Commission has assigned this company's application for authority to acquire control of the Missouri-Kansas-Texas and that of the latter to acquire control of the St. Louis Southwestern for hearing before Director Mahaffie of the commission's Bureau of Finance at Dallas, Tex., on September 28.

MISSOURI PACIFIC.—*Seeks Louisiana Short Line.*—Negotiations are reported under way for purchase of the New Orleans & Lower Coast, which operates between New Orleans, La., and Buras, 59.7 miles.

NEW ORLEANS, TEXAS & MEXICO.—*Application for Control of San Antonio Southern.*—This company has applied to the Interstate Commerce Commission for authorization to acquire control of the San Antonio Southern Railway by purchase of the latter's outstanding stock for $600,000. The applicant expressed belief that such acquisition will open up a larger market for the products tributary to the San Antonio line by affording shippers contact with all points reached by the Missouri Pacific system. The San Antonio company owns and operates 40 miles of line extending from Kirk to Christine, Atascosa county, Texas, and operates over the track of the International-Great Northern between Kirk and San Antonio.

The N. O. T. & M. stated in its application to the Commission that there is "no practical or substantial competition in any way between any of the lines of the Missouri Pacific-Gulf Coast Lines-International Great Northern system, and the lines of the San Antonio company." The applicant stated that the estimated value of the stock of the San Antonio company is greatly in excess of the sum of $600,000 which it proposes to pay under contract with Harry Landa, the owner of the stock for many years. There are no bonds outstanding.

The Commission was informed that the New Orleans, Texas & Mexico does not own the physical properties of any railways in Texas but owns all of the stock, except directors' shares, and all of the bonds and other outstanding securities of the Beaumont, Sour Lake & Western, Orange & Northwestern, St. Louis, Brownsville & Mexico, San Benito and Rio Grande Valley, Sugar Land, Houston & Brazos Valley, Asherton & Gulf, Rio Grande City, San Antonio, Uvalde & Gulf and also owns all the stock, except directors' shares, of the International-Great Northern.

The San Benito and the Brownsville, subsidiaries of the N. O. T. & M., have requested permis ion from the Commission to construct extensions to their lines. The San Benito proposes to construct an extension from Fernando east 6 miles in Cameron county, Texas, and another extending from San Benito to a connection with the Rio Grande Railway 18 miles to the southeast. The projected extensions would serve agricultural territory. The Brownsville desires to construct an extension from Raymondsville southeast to the Hidalgo, Cameron county, floodway. The funds for the construction of these projects, if approved, will be advanced by the N. O. T. & M.

NEW YORK, CHICAGO & ST. LOUIS.—*Proposed Link.*—The projected line between Gregg and Valley Crossing, Ohio, should be constructed by the Chesapeake & Ohio and not by the Nickel Plate, Albert I. Stiles, intervening stockholder of the C. & O., asserted August 26 in answer filed with the Interstate Commerce Commission to the application of the New York, Chicago & St. Louis Railroad, filed August 2, to construct the proposed link between the lines of the C. & O. and the Hocking Valley. Mr. Stiles represented that in the absence of authorization by the commission to consummate the Nickel Plate merger, the applicant is entirely without financial resources for the construction of the line.

Construction of the link by the Chesapeake & Ohio should be declared "an urgent public convenience and necessity," Mr. Stiles declared, charging that the "Van Sweringens, among other things, have caused the Chesapeake to refrain from building the proposed new line, notwithstanding that they were and are fully aware of the urgency for its construction and that the said

Chesapeake was amply able to finance the cost thereof, and have procured from the said Chesapeake, without any adequate consideration therefor, the agreement permitting the applicant to construct such new line with the funds of the Chesapeake."

Mr. Stiles contended that "the effect of the actions aforesaid has been and is to hamper the service of transportation on the lines of the Chesapeake and Hocking and to reduce the legitimate earnings of said lines, all of which is a continuing fraud against the stockholders of said lines and against the public interest."

NORTHWESTERN TERMINAL—*Reorganization.*—The plan for the reorganization of the Northwestern Terminal Railway was submitted to the Interstate Commerce Commission on August 19 by the Northwestern Terminal Railroad, the new company. Reorganization of the present company has become a necessity, the application stated. Authority was requested by the new company to issue $2,217,000 of first mortgage 5 per cent income gold bonds and 2,217 shares of common stock, the latter without nominal or par value. The commission was informed that more than 98 per cent of the first mortgage bondholders of the old company have accepted the reorganization plan and will retain an interest through the new securities. Application for a certificate to acquire and operate the property also was filed.

The applicant stated that the line will be necessary to the operation of the reorganized Denver & Salt Lake, furnishing its entrance to the passenger and freight depot at Denver, from its terminus at Utah Junction and also its connection with important eastern carriers and the stockyards. The mileage of the terminal line is 7.83. Belief was expressed that with the completion of the Moffat Tunnel on the Denver & Salt Lake serious obstacles in the present operations of that company will be eliminated, and that a shorter line will be made available from Denver to Salt Lake City by certain connections and extensions.

PERE MARQUETTE.—*Bond Issue.*—This company has been authorized by the Interstate Commerce Commission to procure authentication and delivery of $2,868,000 of first mortgage 5 per cent gold bonds to be held until further order of the commission.

PHILADELPHIA & READING.—*Tentative Valuation.*—The Interstate Commerce Commission has issued a tentative valuation report as of 1917 stating the final value for rate-making purposes as $72,179,977 for the property owned and as $200,927,187 for the property used, including leased lines. The cost of reproduction new of the used property was reported as $195,293,135 and the cost of reproduction less depreciation as $143,489,357, exclusive of land. The outstanding capitalization as of valuation date was $90,096,504 and the book investment in road and equipment was $113,654,185, which would be reduced to $106,643,817 by readjustments required by the commission's accounting examination.

QUANAH, ACME & PACIFIC.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire and operate the Motley County, a line of 8.47 miles from Matador Junction to Matador, Tex.

SAN ANTONIO SOUTHERN.—*Proposed Acquisition.*—See New Orleans, Texas & Mexico.

SOUTHERN PACIFIC.—*Trackage Rights.*—This company has applied to the Interstate Commerce Commission to operate under trackage rights over the line of the Fresno Interurban in common with the Atchison, Topeka & Santa Fe. The route of the Fresno Interurban over which the Southern Pacific proposes to operate is approximately 70 miles in length, commencing at a connection with the Santa Fe near Fresno, Calif., and extending east to a point two miles northwest of Minkler, in Fresno county. The applicant represented that the Interurban line traverses an agricultural section, the products of which move to a large extent to points served exclusively by the Southern Pacific.

STOCKTON TERMINAL & EASTERN.—*Transfer of Property.*—This company has requested authority from the Interstate Commerce Commission to issue and deliver 3,000 shares of common stock to Frank A. Guernsey, George E. Catts and F. J. Dietrich, composing the committee for the bondholders, in exchange for the property formerly owned by the Stockton Terminal & Eastern and bought in at foreclosure sale by the bondholders' committee.

UNION PACIFIC.—*Ontario Industrial Spur.*—This company has been granted permission by the Interstate Commerce Commission to operate, as a branch line, its Ontario industrial spur, extending from Keetley Junction on its Park City branch in Summit county, Utah, to Keetley, Wasatch county, a distance of 5.37 miles.

Average Price of Stocks and Bonds

	Aug. 31	Last Week	Last Year
Average price of 20 representative railway stocks	104.16	100.25	85.38
Average price of 20 representative railway bonds	97.92	97.55	90.81

Dividends Declared

Bangor & Aroostook—Common, $.75, quarterly; preferred, $1.75, quarterly, both payable October 1 to holders of record September 14.

Chesapeake & Ohio—Common, $2, quarterly, payable October 1 to holders of record September 8.

Chicago, North Shore & Milwaukee—Prior lien, 1¾ per cent., quarterly; preferred 1½ per cent., quarterly, both payable October 1 to holders of record September 15.

Erie & Pittsburgh—$.87½, quarterly, payable September 10 to holders of record August 31.

Fonda, Johnstown & Gloversville—Preferred, 1½ per cent., quarterly, payable September 15 to holders of record September 10.

Hocking Valley—Common, $2, quarterly, payable September 30 to holders of record September 8.

St. Louis Southwestern—Preferred 1¼ per cent., quarterly, payable September 30 to holders of record September 15.

Valuation Reports

The Interstate Commerce Commission has issued final or tentative valuation reports, placing the final value for rate-making purposes of the property owned and used for common carrier purposes, as of the respective valuation dates, as follows:

FINAL REPORTS

Central Vermont	$310,000	1919
Eastern Kentucky	1,005,370	1916
Georgia Southwestern & Gulf	450,000	1918
South Shore	34,500	1916
Carolina & Tenn. Southern	377,077	1915
Combs, Cass & Eastern	226,000	1918
Pittsburgh, Allegheny & McKees Rocks	919,355	1917

TENTATIVE REPORTS

Pennsylvania & Atlantic (owned but not used)	$1,960,000	1918
Freehold & Jamesburg	855,000	1918
Johnsonburg	395,000	1918
Cherry Tree & Dixonville	1,688,500	1917
West Side Belt	5,044,800	1917

LOUIS B. MILLER, of San Francisco, driving a Wills-Sainte Claire roadster, arrived in New York City on August 27, having completed a trip across the continent from the Pacific Coast in 83 hours, 12 minutes, said to be the best record for such a trip by automobile. The estimated distance traveled was 3,367 miles, making the rate of speed 40 miles an hour. Miller had with him one companion, who acted as mechanic and relief driver.

Fall River Boat Train, New York, New Haven & Hartford, at Roxbury, Mass.

Railway Officers

Operating

G. F. Baker has been appointed trainmaster of the Atlantic Coast Line, with headquarters at Charleston, S. C., succeeding **R. B. Bennett,** resigned.

John Cannon, general manager of the Missouri Pacific, with headquarters at St. Louis, Mo., has been elected vice-president and general manager in charge of operation, with the same headquarters.

A. G. Fish, chief dispatcher of the Galveston division of the Atchison, Topeka & Santa Fe, with headquarters at Galveston, Tex., has been promoted to trainmaster, with the same headquarters, succeeding **D. A. Ross,** deceased.

S. T. Cantrell, assistant to the vice-president in charge of operation on the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been appointed superintendent of the Central division, with headquarters at Ft. Smith, Ark., to succeed **S. R. Kennedy,** acting superintendent, who has been appointed superintendent of terminals, with headquarters at Tulsa, Okla., succeeding **E. E. McGuire,** who has been transferred to Memphis, Tenn., in place of **J. J. O'Neil,** resigned.

R. A. McCranie, general superintendent of the Atlantic Coast Line, with headquarters at Savannah, Ga., has been promoted to assistant general manager, with headquarters at Jacksonville, Fla. **J. P. Walker,** superintendent of transportation, with headquarters at Jacksonville, Fla., has been appointed to succeed Mr. McCranie as general superintendent at Savannah. **O. H. Page,** general superintendent at Jacksonville, Fla., has been appointed superintendent of transportation, with the same headquarters. The position of general superintendent at Jacksonville has been abolished.

Traffic

F. H. Beeman has been appointed foreign freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., a newly created position.

J. F. Youse, assistant general freight and passenger agent of the New York Central, with headquarters at Charleston, W. Va., has retired under the pension rules of the company. **T. J. Minich** has been appointed division freight and passenger agent at Charleston, in place of Mr. Youse.

Mechanical

Roston Tuck has been appointed acting master mechanic of the Arizona division of the Atchison, Topeka & Santa Fe, with headquarters at Needles, Cal., succeeding **G. Searle,** who has been granted leave of absence.

O. A. Garber, mechanical superintendent of the Missouri Pacific, with headquarters at St. Louis, Mo., has been promoted to assistant chief mechanical officer, with the same headquarters. He will be succeeded by **E. F. Stroeh,** superintendent of shops, with headquarters at North Little Rock, Ark., who in turn will be replaced by **W. H. McAmis,** master mechanic, with headquarters at Hoisington, Kan. Mr. McAmis will be relieved by **W. C. Smith,** assistant to the chief mechanical officer, with headquarters at St. Louis, Mo. **A. P. Housholder,** master mechanic, with headquarters at St. Louis, has been promoted to mechanical superintendent of the Texas lines, with headquarters at Houston, Tex., and will be succeeded by **J. M. Whalen,** master mechanic, with headquarters at Little Rock, Ark., who in turn will be neglected by **H. W. Reinhardt,** master mechanic, with headquarters at Monroe, La. Mr. Reinhardt will be succeeded by **J. P. Roquemore,** mechanical superintendent, with headquarters at Houston, Tex.

Obituary

Wm. A. Nettleton, who retired as superintendent of motive power of the Chicago, Rock Island & Pacific in 1911, died on August 30 in London, England.

Colonel E. M. Heigho, formerly president and general manager of the Pacific & Idaho Northern, who retired in 1918 on account of ill-health, died at his home at Boise, Idaho, on August 27.

Frank A. Smith, assistant secretary and treasurer of the Chicago, Rock Island & Pacific, with headquarters at New York, died at his home in Maplewood, N. J., on August 23 of heart disease.

William Hood, formerly chief engineer of the Southern Pacific, with headquarters at San Francisco, Cal., who retired in May, 1921, died at San Francisco on August 26, after a short illness. He was born on February 4, 1846, and was graduated from Dartmouth College. He entered railway service in May, 1867, as a rodman on the Central Pacific, being promoted to assistant engineer in January, 1868. Mr. Hood was transferred to the Southern Pacific in June, 1872, and in August, 1875, was promoted to chief assistant engineer. He served in a similar capacity on the Central Pacific from June to October, 1883, being promoted to chief engineer in the latter month. Mr. Hood was made chief engineer of the Southern Pacific, Pacific system, in August, 1885, holding that position for more than a third of a century until his retirement. He had charge of the development of most of the Southern Pacific lines in the west, including the construction of the lines over the Siskiyou mountains in Oregon and over the Tehachapi mountains in California, which latter projects involved unusually difficult engineering problems in avoiding heavy grades through unusually rugged country.

William Hood

Albert B. Bierck, comptroller of the Reading Company, died at his summer home in Westport, Conn., on August 28, of heart disease. Mr. Bierck was born on October 9, 1867, and was educated at New York University. He first entered railway service in 1887 as a freight clerk with the Pennsylvania at New York, since which he was consecutively to August 12, 1918, in charge of lighterage for the Baltimore & Ohio at New York, traveling agent for the Northern Pacific and Union Pacific, train dispatcher for the Northern Pacific, general manager and auditor for the Prospect Park & Coney Island, general auditor for the Long Island and the Montauk Steamship Company. From August 12, 1918, to February 18, 1920, Mr. Bierck served as federal auditor for the Philadelphia & Reading, the Central of New Jersey, the Staten Island Rapid Transit and the Baltimore & Ohio, New York terminals. Mr. Bierck took up the duties of comptroller of the Philadelphia & Reading on February 18, 1920, and in addition served as assistant secretary. He was for a time vice-president of the Reading Company, and at the time of his death was serving as comptroller of the company.

SEVENTY RADIO RECEIVING SETS were installed by the Southern Pacific in various isolated construction camps along the line of its recently completed Natron Cut-off, in Oregon and California, each camp having from one to eight sets. These instruments were provided as an aid in keeping the workmen contented.